

# + INSTALLATION AND SERVICING

## FALCON GTS

4 - 8

When replacing any part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Ideal.

**For the very latest copy of literature for specification and maintenance practices visit our website [www.idealcommercialboilers.com](http://www.idealcommercialboilers.com) where you can download the relevant information in PDF format.**



# GENERAL

**Table 1 Performance Data**

Boiler		GTS 4	GTS 5	GTS 6	GTS 7	GTS 8
Number of Sections		4	5	6	7	8
Maximum	kW	50	64	78	92	100
Heat Output	Btu/hx10 <sup>3</sup>	170	218	266	314	341
Minimum	kW	40	50	64	78	92
Heat Output	Btu/hx10 <sup>3</sup>	136	170	218	266	314
Hydraulic	mbar	20.3	33.3	49.3	68.4	84.0
Resistance at 11k	in w.g.	8.1	13.3	19.7	27.4	33.6
Hydraulic	mbar	6.1	10.1	14.9	20.7	25.4
Resistance at 20k	in w.g.	2.5	4.0	6.0	8.3	10.2
Combustion Chamber	mbar	0.5	0.6	0.8	0.8	0.9
Resistance (at zero draught)	in w.g.	0.20	0.24	0.32	0.32	0.36
Minimum Draught at Smokehood	mbar	0	0	0	0	0
Outlet (for max. output)	in w.g.	0	0	0	0	0

## Oil

Maximum Gross	l/h	5.65	7.22	8.78	10.37	11.25
Oil Rate	gal/h	1.24	1.59	1.93	2.28	2.48
Maximum Flue	m <sup>3</sup> /s	0.030	0.039	0.047	0.059	0.062
Gas Volume	ft <sup>3</sup> /min	65	83	100	125	131
Flue Gas CO <sub>2</sub> / Temperature	% / °C	12 / 200	12 / 200	12 / 200	12 / 200	12 / 200

## Gas

Input	kW	60.5	77.39	94.09	111.11	120.92
Maximum	m <sup>3</sup> /h	5.64	7.20	8.75	10.34	11.25
Gas Rate	ft <sup>3</sup> /h	198.6	254.0	308.8	364.7	396.9
Maximum Flue	m <sup>3</sup> /s	0.031	0.040	0.048	0.058	0.064
Gas Volume	ft <sup>3</sup> /min	66	84	103	124	135
Flue Gas CO <sub>2</sub> / Temperature	% / °C	9 / 200	9 / 200	9 / 200	9 / 200	9 / 200

**Table 2 General Data**

Flow Connection		R 1 1/4"	R 1 1/4"	R 1 1/2"	R 1 1/2"	R 1 1/2"
Return Connection		R 1 1/4"	R 1 1/4"	R 1 1/2"	R 1 1/2"	R 1 1/2"
Maximum Operating Pressure	bar	4	4	4	4	4
Boiler Thermostat Setting	°C	30-90	30-90	30-90	30-90	30-90
Safety Thermostat Setting	°C	110	110	110	110	110
Nominal Flue	mm	153	153	180	180	180
Diameter	in.	6	6	7	7	7
Boiler Water	l	36	43	50	57	64
Content	gal	7.9	9.5	11.0	12.5	14.1
Boiler DRY Weight	kg	254	295.5	343.5	380.5	422.5
less Burner Unit	lb	560	651.5	757.5	839	931.5

### Note.

*Fuel rates and flue gas data relate to maximum output ratings.*

*Gas firing data relates to the use of NATURAL GAS ONLY.*

*Details for the use of LPG are available on request from Ideal Boilers.*

*Natural gas consumption is calculated using a calorific value of 38.7MJ/m<sup>3</sup> (1038Btu/ft<sup>3</sup>) gross or 34.9MJ/m<sup>3</sup> (935Btu/ft<sup>3</sup>) nett at 15°C and 1013.25mbar.*

*Oil rates relate to Gas Oil using a calorific value of 45.56 MJ/kg gross or 42.69 MJ/kg nett.*

### HEALTH & SAFETY DOCUMENT NO. 635

**The electricity at work regulations, 1989.** The manufacturer's notes must NOT be taken, in any way, as overriding statutory obligations.

**IMPORTANT.** These appliances are CE certified for safety and performance. It is, therefore, important that no external control devices, e.g. flue dampers, economisers etc., are directly connected to these appliances unless covered by these Installation and Servicing Instructions or as otherwise recommended by **Ideal Boilers** in writing. If in doubt please enquire.

Any direct connection of a control device not approved by **Ideal Boilers** could invalidate the certification and the normal appliance warranty. It could also infringe the Gas Safety Regulations and the above regulations.

## CONTENTS

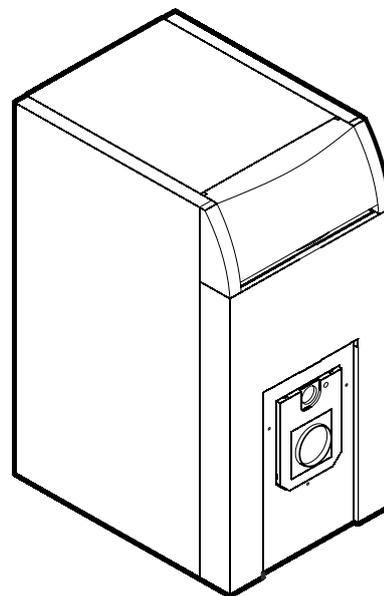
Assembly.....	11-21
Boiler Clearances.....	6
Burner Connection.....	11
Commissioning and Testing.....	30, 31
Electrical Connections.....	22-24
Electrical Supply.....	5
Flue Installation.....	5
Fluing.....	10
Gas Safety Regulations.....	4
Gas Supply.....	4
Hydraulic Resistance.....	2
Initial Lighting.....	31
Introduction.....	3
Installation.....	10
Option Kits.....	3
Performance Data.....	2
Servicing.....	32
Ventilation.....	7
Water Circulation.....	5
Water Connections.....	7
Water System Requirements.....	8
Water Treatment.....	5
Wiring Diagrams.....	25, 26

## Falcon GTS

**Gas and Fuel Oil**

**PI No.** 1312 BR 4657

**Destination Countries:** GB, IE



## INTRODUCTION

The Falcon GTS boilers are a range of cast iron sectional pressure jet boilers offering high efficiency operation, ease of maintenance, fuel flexibility and low emissions in a compact package. Suitable for oil or gas operation the Falcon GTS range is supplied in a choice of 5 standard models, rated in outputs from 40kW (136,500 Btu/h) to 100kW (341,000 Btu/h) the range has a maximum operating pressure of 4 bar. The GTS 7 and GTS 8 may be high/low operation.

Designed with a large combustion chamber and 3 pass, horizontal flue way incorporating fins and cast iron turbulators, the Falcon GTS ensures maximum heat transfer efficiency.

The boilers are suitable for: combined indirect pumped domestic hot water and central heating systems; independent indirect pumped domestic hot water or central heating systems.

Fully pumped systems may be open vented or sealed.

The boilers are NOT suitable for:

1. Gravity DHW systems
2. Gravity heating systems
3. Direct domestic hot water supply

### Options

DHW Remote Sensor Kit (AD212).

Burners with high/low operation are available on Models GTS 7 and GTS 8 with FM196 control panel

**CAUTION.** To avoid the possibility of injury during the installation, servicing or cleaning of this appliance, care should be taken when handling edges of sheet steel components.

# GENERAL

## SAFETY

### Current Gas Safety (Installation and Use) Regulations or rules in force.

It is law that all gas appliances are installed and serviced by a Gas Safe Registered Installer in accordance with the regulations below. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure the law is complied with.

The following must be conformed with:

Current Building Regulations and Clean Air Act

Water Authority Regulations

Local Authority Regulations and Regional Bylaws

Gas Safety Regulations

Any special regional requirements of local Electricity and Gas undertaking.

Fire Service and Insurance Company requirements.

In the interests of safety, a competent installer should be employed to effect the installation of the appliance. Manufacturer's notes must NOT, in any way, be taken as overriding statutory obligations.

The installation of the boiler MUST also be in accordance with the latest I.E.E. (BS7671) Wiring Regulations, local buildings regulations, bye-laws of the local water authority, the building regulations and the Building Standards (Scotland) and any relevant requirements of the local authority.

Detailed recommendations are contained in the following Codes of Practice:

- |                           |   |
|---------------------------|---|
| <b>BS 799 Pt4 &amp; 7</b> | Oil burning equipment.  |
| <b>BS 799 Pt5</b>         | Oil storage tanks.  |
| <b>BS 5410 Pt1</b>        | Installation for space heating and hot water supply.  |
| <b>BS 5440</b>            | Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases). |
| Part 1                    | Specification for installation of flues   |
| Part 2                    | Specification for installation and maintenance of ventilation for gas appliances.   |
| <b>BS 5854</b>            | Flues and flue structures in buildings.   |
| <b>BS 5885 Pt1</b>        | Gas burners - with inputs 60kW and above.   |
| <b>BS 6644</b>            | Installation of gas fired hot water boilers of rated input between 70kW and 1.8MW (net) (2nd and 3rd family gases).                             |
| <b>BS 6798</b>            | Installation of gas fired hot water boilers of rated input not exceeding 70kW.  |

- |                   |   |
|-------------------|---|
| <b>BS 6880</b>    | Low temperature hot water heating systems of output greater than 45kW.                              |
| Part 1            | Fundamental and design considerations   |
| Part 2            | Selection of equipment.   |
| Part 3            | Installation, commissioning and maintenance.  |
| <b>BS 6891</b>    | Installation of low pressure gas pipework of up to 28mm (R1) in domestic premises (2nd family gas). |
| <b>EN 303.1</b>   | Heating boilers with forced draught burners. General requirements.                                  |
| <b>EN 303.2</b>   | Heating boilers with forced draught burners with atomising oil burners.                             |
| <b>EN 304</b>     | Test code for heating boilers for atomizing oil burners.  |
| <b>73/23 EEC</b>  | Low voltage directive. (Relevant standard is EN60335.1)   |
| <b>89/336 EEC</b> | Electromagnetic Compatibility Directive. (Relevant standards are EN50081.1, EN50082.1 and EN55014.) |
| <b>90/396 EEC</b> | Gas Appliances Directive. (Relevant standards are EN303.1, EN303.2 and EN304.)                      |
| <b>92/42 EEC</b>  | Boiler Efficiency Directive.  |
| <b>IGE/UP/1</b>   | Soundness testing and purging of industrial and commercial gas installation.                        |
| <b>IGE/UP/2</b>   | Gas installation pipework, boosters and compressors on industrial and commercial premises.          |
| <b>IGE/UP/10</b>  | Installation of gas appliances in industrial and commercial premises.                               |

## SAFE HANDLING OF SUBSTANCES

Care should be taken when handling the boiler insulation panels, which can cause irritation to the skin. No asbestos, mercury or CFCs are included in any part of the boiler or its manufacture.

## GAS SUPPLY

The local gas supplier should be consulted, at the installation planning stage, in order to establish the availability of an adequate supply of gas. An existing service pipe must NOT be used without prior consultation with the local gas supplier.

A gas meter can only be connected by the local gas supplier or by a Gas Safe Registered Engineer.

An existing meter should be checked, preferably by the gas supplier, to ensure that the meter is adequate to deal with the rate of gas supply required. A minimum working gas pressure of 17.5mbar MUST be available at the boiler inlet.

Do not use pipes of smaller size than the burner inlet gas connection.

The complete installation MUST be tested for gas soundness and purged in accordance with the appropriate standards listed above.

## FLUE INSTALLATION

### IMPORTANT

Assembly and Installation Instructions for Ideal Falcon GTS heating boilers should be read in conjunction with the general technical data tables enclosed and any other technical publication supplied with the burner.

**NOTE TO THE INSTALLER: LEAVE THESE INSTRUCTIONS ADJACENT TO THE BOILER.**

## GENERAL

It is the responsibility of the installer to ensure, in practice, that products of combustion discharging from the terminal cannot re-enter the building or any other adjacent building through ventilators, windows, doors, other sources of natural air infiltration, or forced ventilation / air conditioning.

If this should occur the appliance MUST be turned OFF, labelled as 'unsafe' and corrective action taken.

The flue must be installed in accordance with the appropriate standards listed on page 4.

### WATER CIRCULATION SYSTEM

The system pump MUST be connected to the boiler.

The boiler must NOT be used for direct hot water supply. The hot water storage cylinder MUST be of the indirect type.

Single feed, indirect cylinders are not recommended and MUST NOT be used on sealed systems.

The appliances are NOT suitable for gravity central heating nor are they suitable for the provision of gravity domestic hot water.

The hot water cylinder and ancillary pipework, not forming part of the useful heating surface, should be lagged to prevent heat loss and any possible freezing - particularly where pipes run through roof spaces and ventilated underfloor spaces.

The boiler must be vented.

Draining taps MUST be located in accessible positions, which permit the draining of the whole system - including the boiler and hot water storage vessel. They should be at least 1/2" BSP nominal size and be in accordance with BS. 2879.

The central heating system should be in accordance with the relevant standards listed on page 4.

Due to the compact nature of the boiler the heat stored within the castings at the point of shutdown of the burner must be dissipated in order to avoid overheating. In order to allow pump operation after burner shutdown the boiler control box incorporates a pump overrun facility. In order to make use of this, the pump must be supplied from the terminals inside the boiler. Note: for pumps requiring greater than 1.0amp current, they must be connected via a relay.

### WATER TREATMENT FOR HOT WATER AND HEATING BOILERS

There is a basic need to treat the water contained in all heating and indirect water systems, particularly open vented systems. It is assumed, incorrectly, that because boilers are operating in conjunction with what is apparently a closed circuit an open vented system will not, under normal circumstances, allow damage or loss of efficiency due to hardness salts and corrosion once the initial charge of water has been heated up a few times.

1mm of lime reduces the heat transfer from metal to water by 10%.

In practice the deposition of these salts is liable to cause noises from the boiler body or even premature boiler failure. Corrosion and the formation of black iron oxide sludge will ultimately result in premature radiator failure.

Open vented systems are not completely sealed from the atmosphere if proper venting and expansion of system water is to be achieved. The same tank is used to fill the system with water and it is through the cold feed pipe that system water expands

into the tank when the boiler passes heat into the system.

Conversely, when the system cools, water previously expelled is drawn back from the tank into the system together with a quantity of dissolved oxygen.

Even if leakage from the heating and hot water system is eliminated there will be evaporation losses from the surface of the tank which, depending upon ambient temperature, may be high enough to evaporate a large portion of the system water capacity over a full heating season.

There will always be corrosion within a heating or hot water system to a greater or lesser degree, irrespective of water characteristics, unless the initial fill water from the mains is treated. Even the water in closed systems will promote corrosion unless treated. For the reason stated, **Ideal Boilers** strongly recommend that when necessary the systems is thoroughly cleaned, prior to the use of stable inhibitor, which does not require continual topping up to combat the effects of hardness salts and corrosion on the heat exchangers of the boiler and associated systems.

**Ideal Boilers** advise contact directly with specialists on water treatment such as:

Sentinel Performance Solutions  
The Heath Business & Technical Park,  
Runcorn  
Cheshire,  
WA7 4QX  
Tel: 0800 389 4770  
[www.sentinel-solutions.net](http://www.sentinel-solutions.net)

or

Fernox Manufacturing Co. Ltd.  
Cookson Electronics,  
Forsyth Road, Sheerwater  
Woking, Surrey,  
GU21 5RZ  
Tel: 01799 521 133

### ELECTRICAL SUPPLY

**WARNING** This appliance must be earthed.

A 230V - 50Hz mains supply is required, fused at 5amps.

Wiring external to the appliance MUST be in accordance with the current I.E.E. (BS7671) Wiring Regulations and any local regulations which apply.

The point of connection to the mains should be readily accessible and adjacent to the boiler.

### LOCATION OF THE BOILER

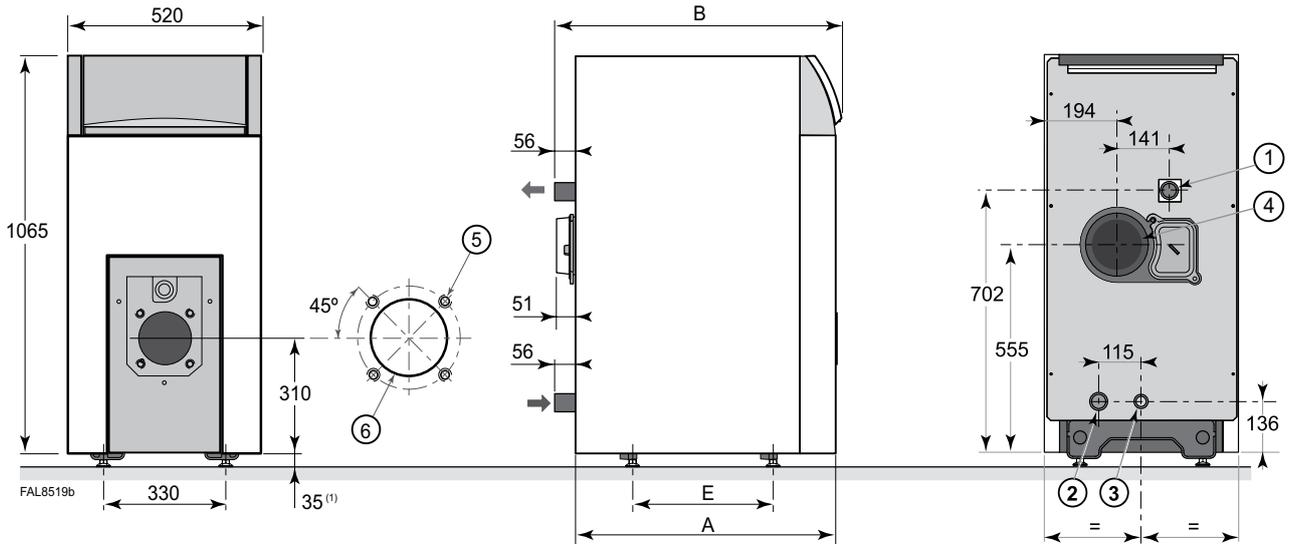
The boiler must stand on a non-combustible floor (i.e. concrete or brick) which must be flat, level and of a suitable load bearing capacity to support the weight of the boiler (when filled with water) and any ancillary equipment.

If the boiler is mounted on a plinth then the dimensions must exceed the plan area of the boiler by at least 75mm on each side.

The boiler must not be fitted outside.

# GENERAL

## 1 BOILER DIMENSIONS



(1) Adjustable feet: basic height 50mm with 35 to 65mm adjustment range.

Boiler	GTS 4	GTS 5	GTS 6	GTS 7	GTS 8
A	700	827	954	1081	1208
B	772	899	1026	1153	1280
④	153	153	180	180	180
① ②	R1 <sup>1</sup> / <sub>4</sub> "	R1 <sup>1</sup> / <sub>4</sub> "	R1 <sup>1</sup> / <sub>2</sub> "	R1 <sup>1</sup> / <sub>2</sub> "	R1 <sup>1</sup> / <sub>2</sub> "
E	380	507	634	761	888

### KEY

1. Heating outlet
2. Heating return
3. Drainage / filling orifice Rp 3/4
4. Flue gas spigot
5. 4xM8 on Ø 150 and 4 markings on Ø170
6. Drilling Ø 110 - Precut Ø 130

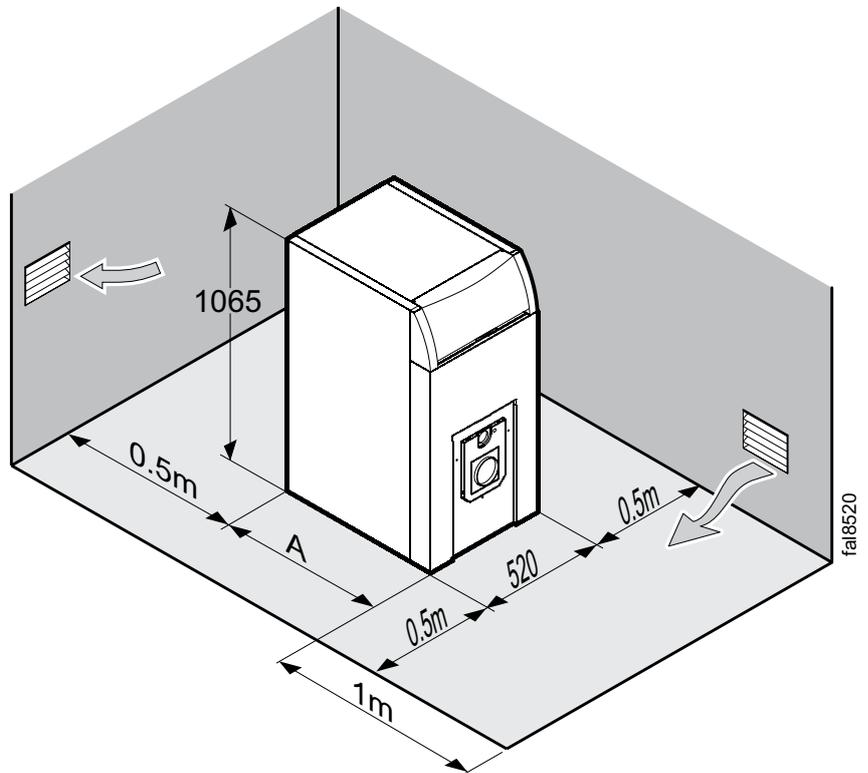
## 2 BOILER CLEARANCES

The minimum dimensions indicated on the following drawing must be respected to ensure good access around the boiler.

### Note.

To allow the inlet of the combustion air, the boiler room must be adequately ventilated, the section and the location of which must comply with local recommendations.

Refer also to Frame 3.



Boiler	Dimension mm A
GTS 4	700
GTS 5	827
GTS 6	954
GTS 7	1081
GTS 8	1208

## 3 VENTILATION

Safe, efficient and trouble-free operation of conventionally flued gas boilers is vitally dependent on the provision of an adequate supply of fresh air to the room in which the appliance is installed.

Ventilation by grilles communicating directly with the outside air is required at both high and low levels. The minimum free areas of these grilles must be according to the following scale:

Position ventilation grilles to avoid the risk of accidental

### Required area (cm<sup>2</sup>) per kW of total rated input (net)

Boiler room	Enclosure	
Low level (inlet)	4	10
High level (outlet)	2	5

Note: Where a boiler installation is to operate in summer months (e.g. DHW) additional ventilation requirements are stated, if operating for more than 50% of time (refer to BS6644).

obstruction by blockage or flooding. If further guidance on ventilation is required then consult BS 6644.

The supply of air by mechanical means to a space housing the boiler should be by mechanical inlet with natural or mechanical extraction. Mechanical extract ventilation with natural inlet must not be used.

Where a mechanical inlet and a mechanical extract system is applied, the design ventilation flow rates should be as in BS 6644.

#### Note.

*For mechanical ventilation systems an automatic control should be provided to cause safety shutdown or lockout of the boiler(s) in the event of failure of air flow in either inlet or extract fans.*

**IMPORTANT.** The use of an extractor fan in the same room as the boiler (or in an adjacent communicating room) can, in certain conditions, adversely affect the safe operation of the boiler.

Where such a fan is already fitted (or if it is intended to fit an extractor fan after installation of the appliance) the advice of the gas supplier should be obtained.

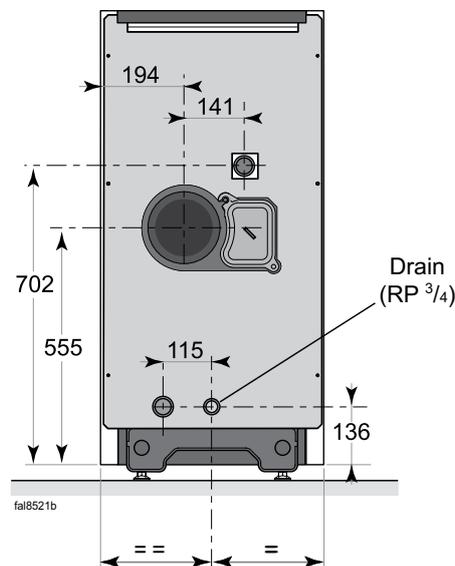
The temperature within a boiler room shall not exceed 25°C within 100 mm of the floor, 32°C at mid height and 40°C within 100 mm of the ceiling.

## 4 BOILER WATER CONNECTIONS

Flow and return connections are positioned at the rear of the boiler and vary in size depending upon the output model. Refer to Table 2, page 2 for sizes.

The flow and returns are provided with threaded connections.

A 3/4" drain connection is provided at the rear bottom of the boiler heat exchanger.



## 5 FILLING THE SYSTEM

Filling shall be performed with a low flow rate from a low point in the boiler room in order to ensure that all the air in the boiler is bled from the high point of the system.

Always stop the pump before filling.

**IMPORTANT.** Instructions for starting up the boiler for the first time after the system is fully or partly drained:

If all the air is not bled naturally to an expansion vessel which opens out onto the air, the system must include manual bleeder

valves, in addition to automatic bleeder valves with the capability to bleed the system by themselves when it is operating. The manual bleeder valves are used to bleed all the high points of the system and to make sure that the filled system is free of air before the burner is turned on.

#### General

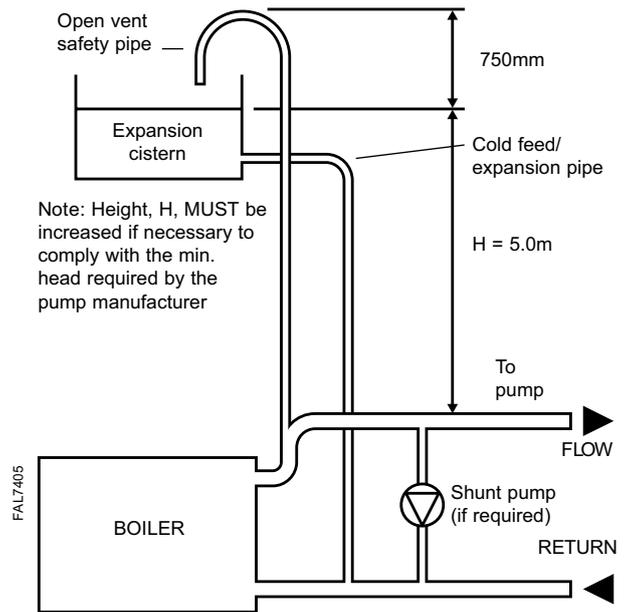
Recommendations relating to the water system are contained in BS. 5449 and BS. 6880.

## 6 OPEN VENTED SYSTEM REQUIREMENTS - minimum static head requirements

The Falcon GTS boiler has a minimum static head requirement of 5.0 metres (16.5 feet approx.) depending on the particular characteristics of the system design (see diagram). The information provided is based on the following assumptions.

1. An open vent/safety pipe connection is made immediately after the flow connection.
2. A cold feed/expansion pipe connection is made to the system return pipe within 0.75m of the boiler return connection.
3. The maximum flow rate through the boiler is based on a temperature difference of 11°C (20°F) at full boiler output with the circulating pump positioned in the flow of the system.
4. The boiler is at the highest point of the system. Systems designed to rise above the flow connections will, of course, automatically require a minimum static head higher than shown.
5. The position of the open vent/safety pipe above the expansion cistern water level is given as a guide only. The final position will depend upon particular characteristics of the system. Pumping over of water into the expansion cistern should be avoided.
6. Both open vent/safety pipe and cold feed/expansion pipes must be of adequate diameter to suit the output of the boiler (see table below).

Boiler Output kW	Open Vent (mm)	Cold Feed (mm)
30 to 60	25	20
60 to 150	32	25



This diagram does not show safety valves & water flow switches etc necessary for safe operation

## 7 SEALED (PRESSURISED) SYSTEMS

### Working pressure 4 bar maximum.

Particular reference should be made to BS. 6644: Section 2; Subsection 11 and Guidance note PM5 "Automatically controlled steam and hot water boilers" published by the Health and Safety Executive.

The information and guidance given below is not intended to override any requirements of either of the above publications or the requirements of the local authority, as or water undertakings.

In general commercial closed pressurised systems are provided with either manual or automatic water make up.

In both instances it will be necessary to fit automatic controls intended to protect the boiler, circulating system and ancillary equipment by shutting down the boiler plant if a potentially hazardous situation should arise.

Examples of such situations are low water level and operating pressure or excessive pressure within the system. Depending on circumstances, controls will need to be either manual or automatic reset. In the event of a shutdown both visual and audible alarms may be necessary.

Expansion vessels used must comply with BS. 4814 and must

be sized on the basis of the total system volume and initial charge pressure.

Initial minimum charge pressure should not be less than 0.5 bar (7.2psi) and must take account of the static head and specification of the pressurising equipment. The maximum water temperatures permissible at the point of minimum pressure in the system are specified in Guidance Note PM5.

When make up water is not provided automatically it will be necessary to fit controls which shut down the plant in the event of the maximum system pressure approaching to within 0.35bar (5psi) of the safety valve setting.

Other British Standards applicable to commercial sealed systems are:

- BS. 6880: Part 2
- BS. 1212
- BS. 6281: Part 1
- BS. 6282: Part 1
- BS. 6283: Part 4

## 8 SYSTEM DESIGN

### Minimum Water Flow

#### Design Flow Rates

The following table gives the flow rate required for each boiler based on a design temperature difference of 11°C (20°F) at the maximum rated output. For hydraulic resistance see General Data table (page 2).

Boiler Size (no of sections)		4	5	6	7	8
Normal water flow rate	l/s	1.09	1.39	1.69	2.00	2.21
	temperature difference 11°C (20°F)g.p.m.	14.4	18.4	22.3	26.4	29.2
Minimum water flow rate	l/s	0.34	0.44	0.53	0.63	0.70
	temperature difference 35°C (63°F)g.p.m.	4.5	5.8	7.0	8.3	9.3

### System Design

Recommendations relating to water system design are contained in BS. 5410: Part 2, BS. 6798 and BS. 6880.

System design must allow for adequate internal circulation within the boiler and sufficient heat release from the boiler body during and immediately after burner firing. Heating and/or hot water controls should be interlocked electrically with the burner, to prevent firing when the system does not demand heat.

Depending on system design it may be necessary to interrupt electrical supply to the burner before any mixing valves are

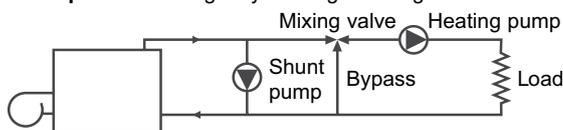
### Minimum Flow Rates

It may be necessary to fit a shunt pump to ensure minimum flow rates.

completely closed to the boiler flow. This will dissipate residual heat. Also a pump overrun of at least 5 minutes is required on plant shutdown to avoid interference trip out of the overheat thermostat. If system return temperature remains below 30°C for most of the heating period some protection from condensation is required.

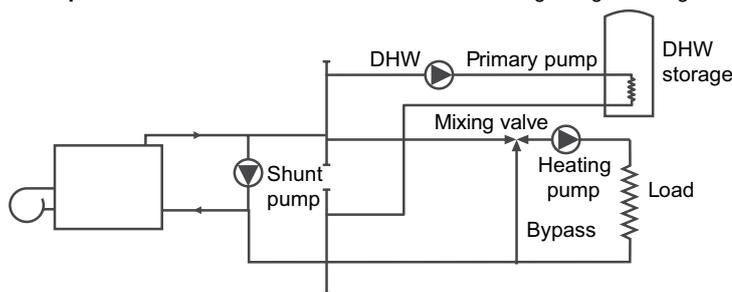
Please contact Ideal Boilers for further information.

#### Example A - Heating only utilizing a mixing valve



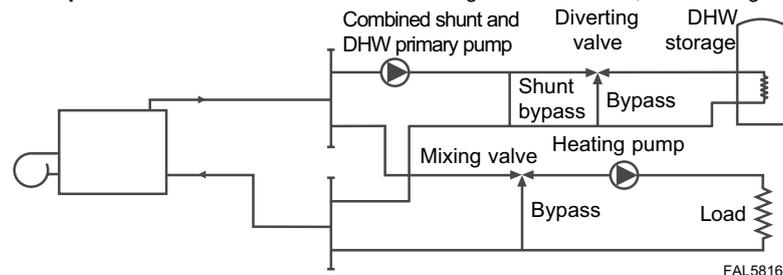
A shunt pump sized on the minimum flow rate required MUST be fitted. Both heating and shunt pumps MUST run on during the overrun period of 5 minutes. The mixing valve MUST NOT be capable of complete closure to bypass, in order that residual heat can be dissipated.

#### Example B - Combined domestic hot water and heating using a mixing valve



A shunt pump sized on the minimum flow rate required MUST be fitted. Provided adequate heat dissipation can be achieved at all times the shunt and DHW primary pumps only may run on during the overrun period of 5 mins - allowing the heating pump to be switched off. This example assumes the DHW primary pump flow rate required is less than that required for the shunt pump.

#### Example C - Combined domestic hot water using a diverter valve, and heating using a mixing valve



The example assumes flow rate required through the DHW storage cylinder is less than that required by the boiler. A combined shunt/DHW primary pump sized on the minimum flow to be required MUST be fitted. Provided adequate heat dissipation can be achieved at all times the combined pump only may run on during the overrun period - allowing the heating pump to switch off. In order to achieve adequate heat dissipation into the DHW storage cylinder, the diverter valve MUST always open during the overrun period of 5 minutes.

Notes: Minimum static head requirements with limit thermostat set at 100°C (212°F) : 2.5m.  
The examples illustrated are intended as a general guide only.  
**Ideal Stelrad Group** will be pleased to advise on specific applications.  
Design and minimum flow rate tables are shown in this leaflet.

# INSTALLATION

## 9 FLUING

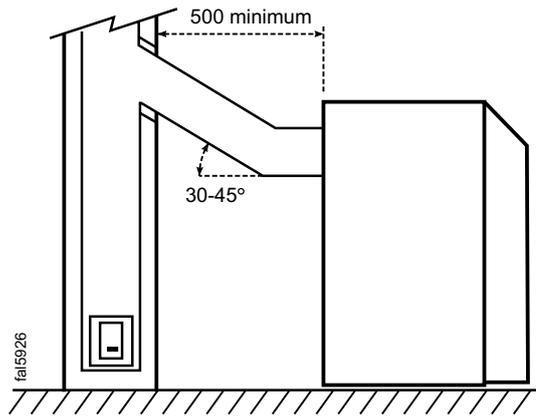
According to the output, the difference between the temperature of the flue gas and the ambient temperature can be as low as 160°C. The installer will have to respect all of the usual precautions (dilution - piping - T for removal of condensation) in order to prevent deterioration of the chimney.

### FLUE SIZE

Refer to applicable regulations while determining the size and height of the flue. Please note that GTS boilers have pressurised and sealed combination chambers and that the pressure at the outlet must not exceed 0 mbar.

Detailed recommendations relating to the design of flues for GAS fired appliances are quoted in BS. 6644 and IGE/UP/10, whilst BS. 5410 Pt. 1 similarly applies to OIL fired boilers.

The table below contains the minimum dimensions of the flue required for each boiler model in order to ensure sufficient draught at the outlet.



However, care must be taken to comply with any applicable national or local regulations.

Boiler	Heat Output kW	Required Draught mbar	Mass Flow of Flue Gases kg/s		Flue Gas Temperature (1) (2) °C	Chimney: Minimum Recommended Dimensions	
			Fuel Oil 13.0% CO <sub>2</sub>	Natural Gas 9.5% CO <sub>2</sub>		Ø min mm	Height m
GTS 4	40-50	0	0.022	0.023	195	153	5
GTS 5	50-64	0	0.028	0.029	195	153	5
GTS 6	64-78	0	0.034	0.036	195	180	5
GTS 7	78-92	0	0.041	0.042	205	180	5
GTS 8	92-100	0	0.045	0.046	205	180	5

(1) : at boiler maximum input.

(2) : Boiler temperature: 80°C (ambient temperature : 20°C).

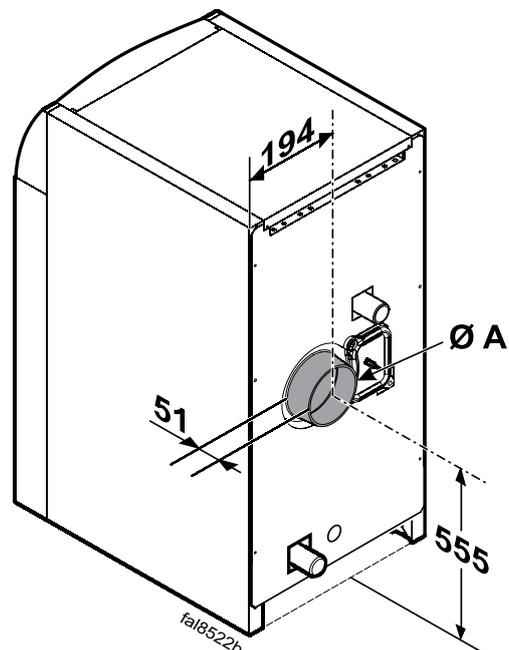
## 10 DIMENSIONAL INFORMATION REQUIRED FOR THE FLUE CONNECTION

### Connection

The connection must be made in a competent manner with airtight pipe in a material that is resistant to hot gases from the combustion and possible acid condensation. This pipe must be as short as possible, be removable and without any sudden change in its section.

The diameter must always be at least equal to that of the boiler outlet.

Boiler Type	Smoke Nozzle Ø A
GTS4, GTS5	Ø 153
GTS6, GTS7, GTS8	Ø 180



# INSTALLATION

## 11 BURNER CONNECTION

### Gas Supply

The gas supply **MUST** be sized in accordance with British Gas recommendations.

The Local Gas Authority should be contacted, at a stage prior to actual installation, for any advice or information required.

### Oil Storage Tank

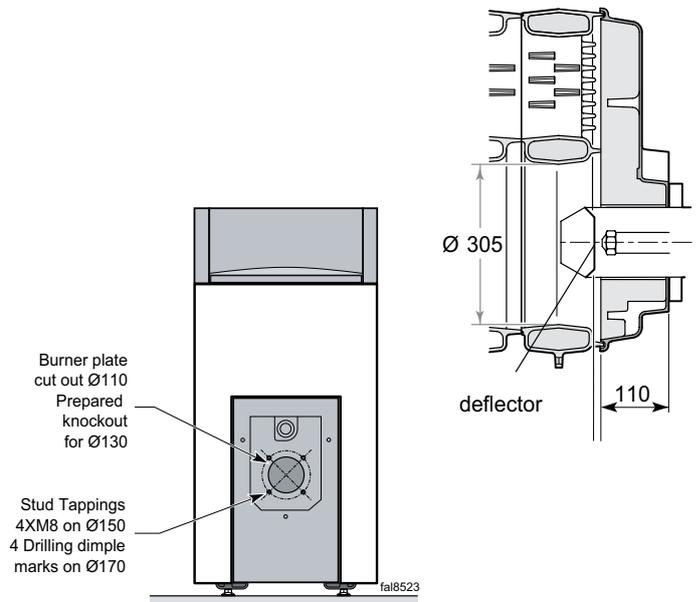
The oil storage tank, oil supply pipe and connections to the burner unit **MUST** comply with the requirements of BS. 799.

The installation should conform to the recognised standards of good practice in the trade and comply with the relevant Codes of Practice, building Regulations and Local Authority, Fire and Insurance requirements.

**IMPORTANT.** The burner head deflector must go past the door insulation as shown opposite.

If there is space between the burner blast tube and door insulation after mounting the burner, a suitable insulation material must be used to pack the space.

Connection, adjustment, start-up and maintenance. (Refer to the instructions delivered with the burner)



## 12 ASSEMBLY

### Packaging:

The tables below show the numbers of the packages which make up the boiler. The packages are listed in the order in which they are opened for assembly.

### Tools required:

- Phillips head screwdriver
- Wide flat screwdriver
- 13 and 17mm spanners
- hammer
- Silicone glue
- JDTE assembly tool
- Simplified assembly tool

Boiler	GTS 4	GTS 5	GTS 6	GTS 7	GTS 8	
Boiler body delivered loose						
- front section	1	1	1	1	1	
- intermediate section	2	3	4	5	6	
- rear section	1	1	1	1	1	
- set of assembly rods	-	-	1	1	1	
Accessory package includes baffles (Quantity)	IL44 3	IL45 3	IL46 5	IL47 5	IL48 4	
Control Panel						
- Standard On/Off	FM195	FM195	FM195	FM195	FM195	
- Optional High/Low	-	-	-	FM196	FM196	
Casing	IL54	IL55	IL56	IL57	IL58	

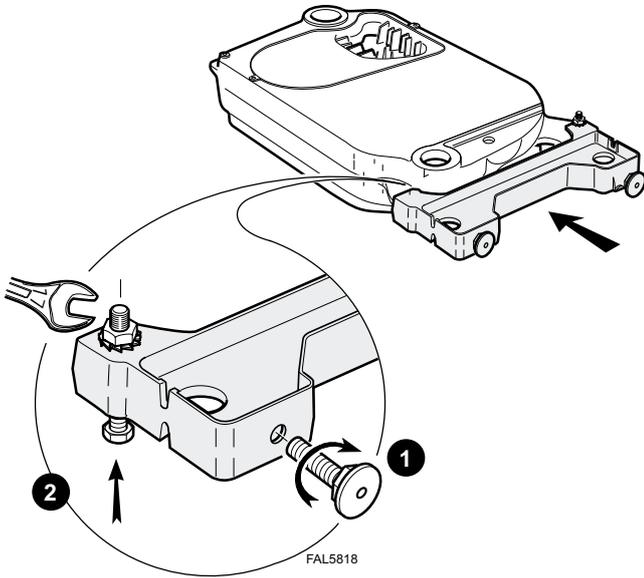
The assembly of any optional devices purchased with the boiler is described in the instructions supplied with the relevant device or in the control panel instructions. The list of available optional devices is provided in the applicable price list.

# INSTALLATION

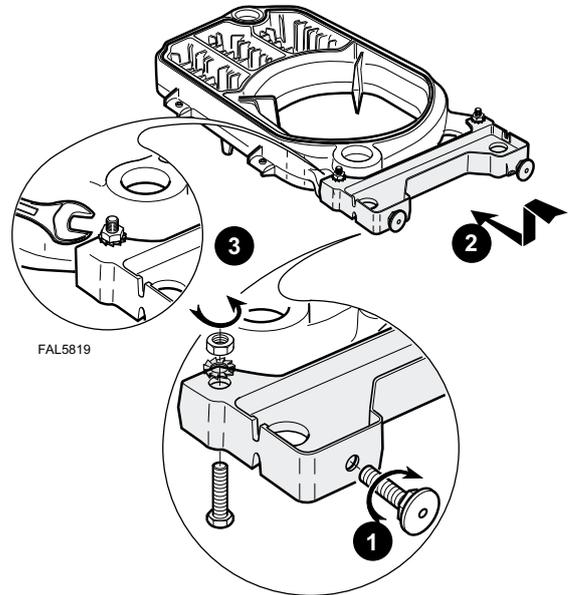
## 13 PREPARING THE FRONT AND REAR SECTIONS

Installing the height convertor and the adjustable feet on the rear section.

1. Fix the adjustable feet (supplied in the bag containing the casing fasteners) onto the height converters.

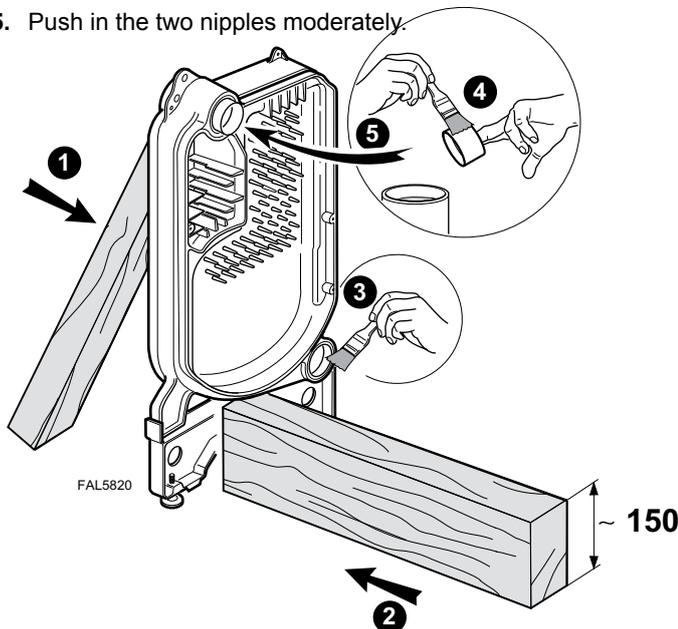


2. Place the rear section on the floor and fix the height convertor with two M10 x 25 bolts, serrated washers and nuts using a 17mm spanner.
3. Place the front section on the floor (with the groove facing up) and fix the height convertor with two M10 x 25 bolts, serrated washers and nuts using a 17mm spanner.

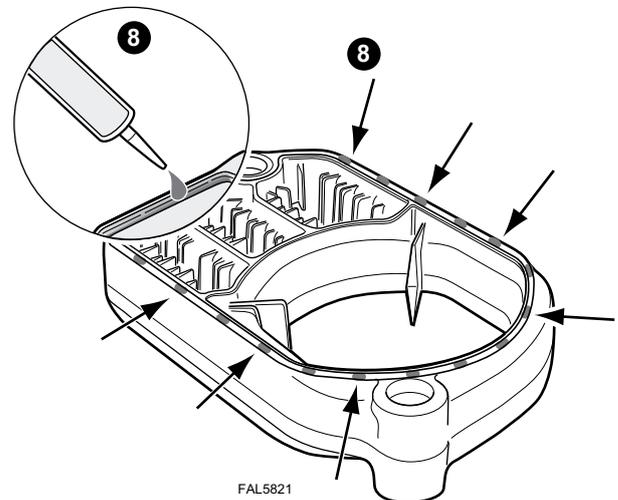


## 14 PREPARING THE SECTIONS

1. Support the rear section with a wooden block.
2. Place a block with a height of approx. 150mm (the length varies from 320 - 820mm depending upon the number of sections) to support intermediate sections.
3. Clean the bores and nipples with kerosene/paraffin.
4. Coat them with the coating material supplied.
5. Push in the two nipples moderately.



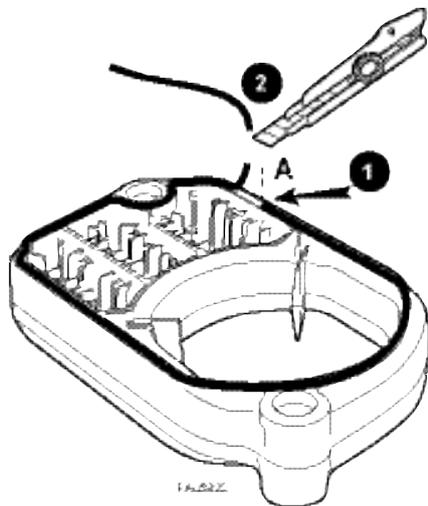
6. Place the intermediate and front sections on the floor, groove upwards.
7. Prepare the silicone cartridge.
8. Put a drop of silicone at about every 200mm of the groove of the intermediate and front sections.



## INSTALLATION

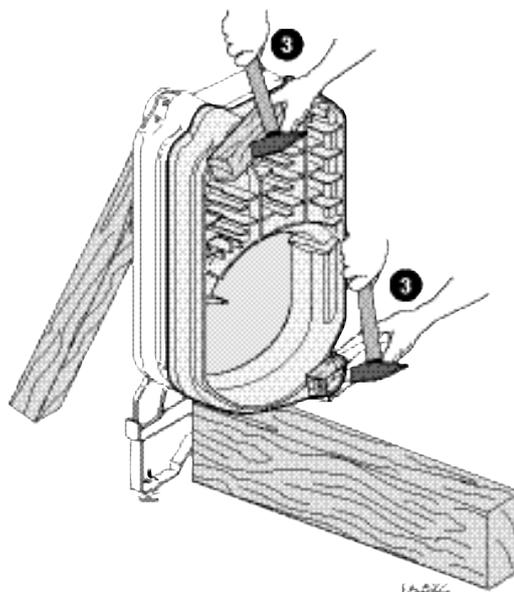
### 15 FITTING THE SILICON BRAID

1. Working from point A, insert the silicone braid into the groove of the intermediate and front sections.
2. Cut it to the correct length.



### 16 ASSEMBLING THE INTERMEDIATE SECTIONS

1. Place the first intermediate section on the wooden block.
2. Fit the connections of the intermediate section onto the nipples in the rear section.
3. Hammer in with the help of a small wooden block.
4. Proceed likewise for the other intermediate sections.



### 17 ASSEMBLING THE FRONT SECTION AND PULLING UP COMPLETE ASSEMBLY

1. Complete the assembly with the front section.
2. Insert the assembly tool through the nipples and tighten.  
**Caution. Do not overtighten.**  
Correct tightening is achieved when the sections come into contact.

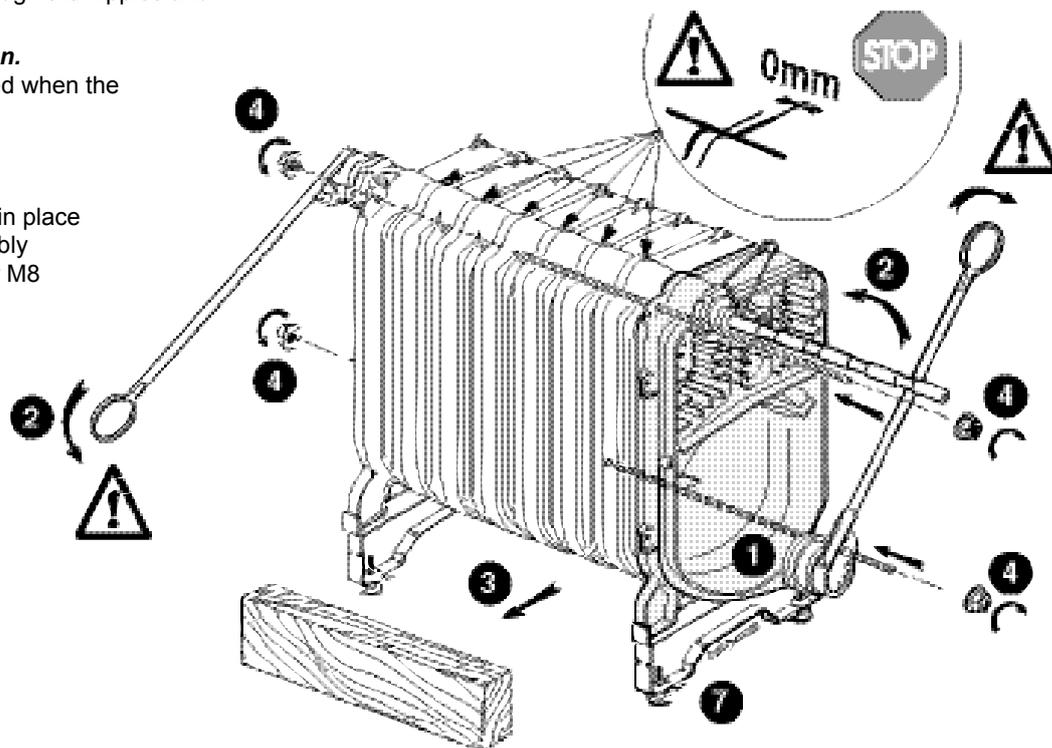
3. Remove the wooden block

4. Slide the two threaded rods in place without removing the assembly tool and secure with the four M8 flanged nuts supplied.

5. Clean off any surplus silicone.

6. Remove the assembly tool.

7. Level the boiler by adjusting its feet.



# INSTALLATION

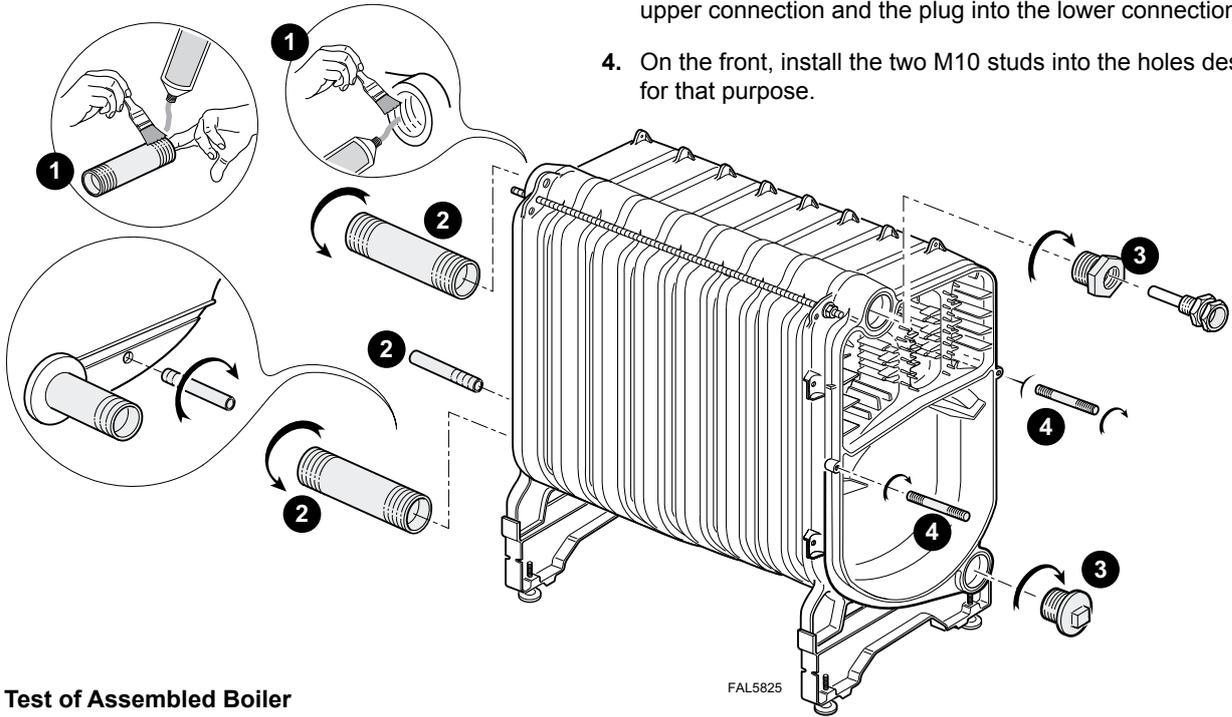
## 18 ASSEMBLING THE FLOW, RETURN AND DRAINING PIPES

1. Coat the threaded and tapped connections of the sections, pipes, plugs and sensor tubes with thread sealing compound (not supplied).

2. Screw the 2 flow and return pipes and the draining pipe into the rear section.

3. Screw the threaded bush with the sensor pocket into the upper connection and the plug into the lower connection.

4. On the front, install the two M10 studs into the holes designed for that purpose.



### Hydraulic Test of Assembled Boiler

Ensure that all the air in the boiler is vented to avoid any bursting of the body.

After assembling the boiler body, the installer must carry out a water tightness test at a hydraulic pressure of 1.5 times the design pressure for a period of 30 minutes. The test must be done at room temperature.

**Note.** Any drop in pressure indicates a leakage in the boiler body.

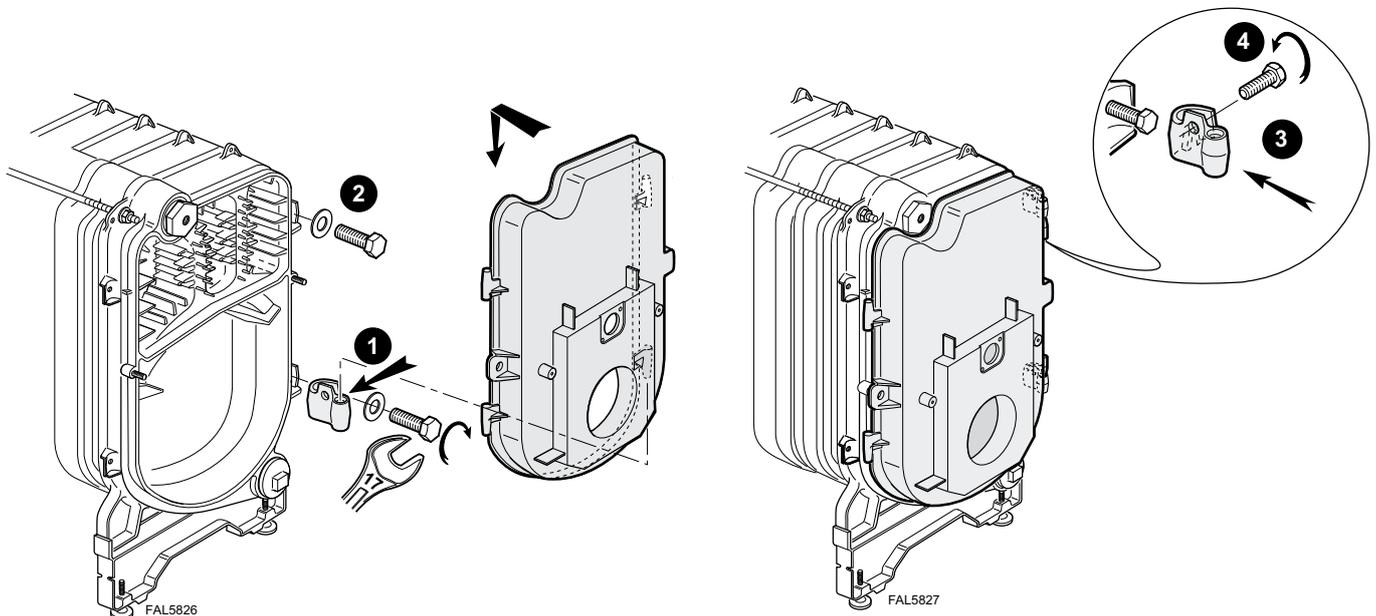
## 19 ASSEMBLING THE DOOR WITH RIGHT HAND OPENING

1. Put the lower hinge in place, press it against the front section and secure it with an M10 x 50 bolt and wide CL 10-20 tapered washer (17mm spanner).

2. Screw in loosely the other M10 x 50 hinge bolt and wide CL 10-20 tapered washer.

3. Mount the upper hinge onto the M10 x 50 screw and secure.

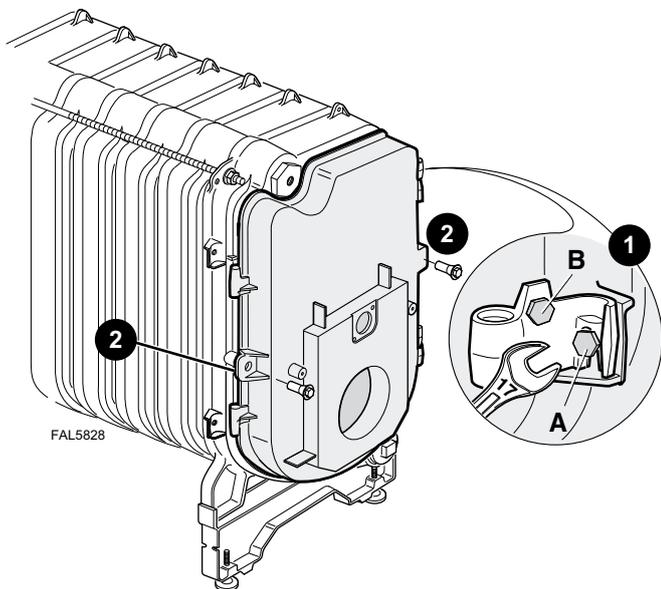
4. Screw in loosely M10 x 20 adjusting screw on the upper hinge.



# INSTALLATION

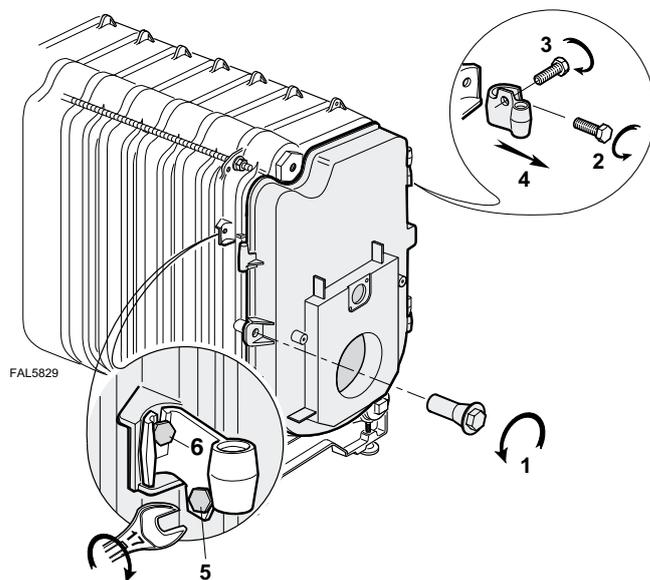
## 20 DOOR ALIGNMENT

- Adjust the upper hinge to align the door by
  - Loosen screw **A**
  - Adjust screw **B** so that the door is positioned correctly.
  - Tighten screw **A**.
- Secure the door with the two special bolts



## 21 ASSEMBLING THE DOOR WITH LEFT-HAND OPENING

Assembling the door with left-hand opening

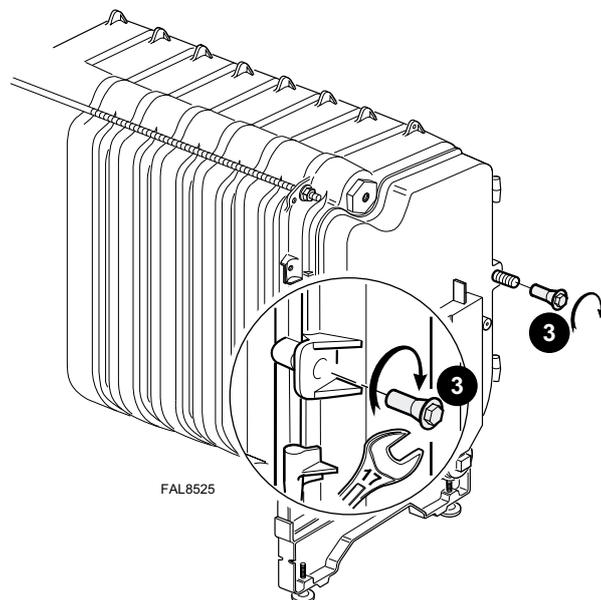
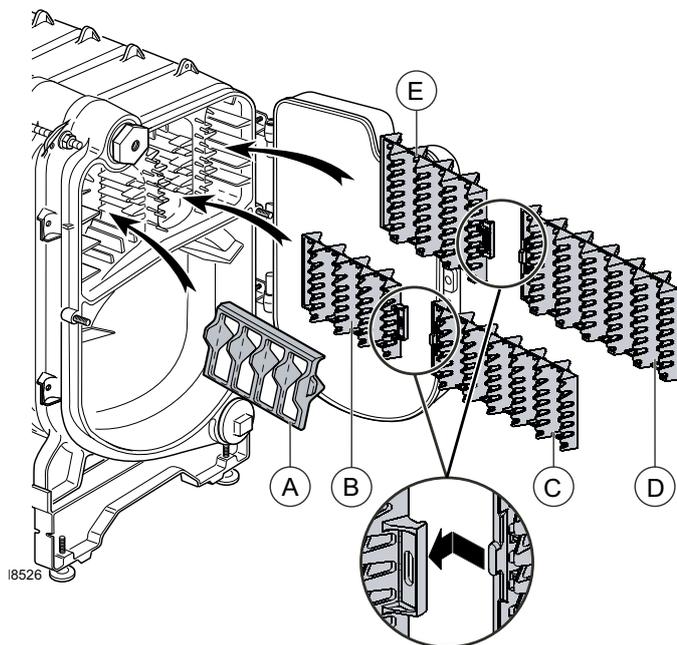


Proceed similarly, with the hinges on the left-hand side, as described in Frames 19 and 20.

## 22 POSITIONING THE FLUE BAFFLES

- Open the door.
- Place the flue baffles in the flues in accordance with the table.
- Close and secure the door with the special bolts (17mm spanner).

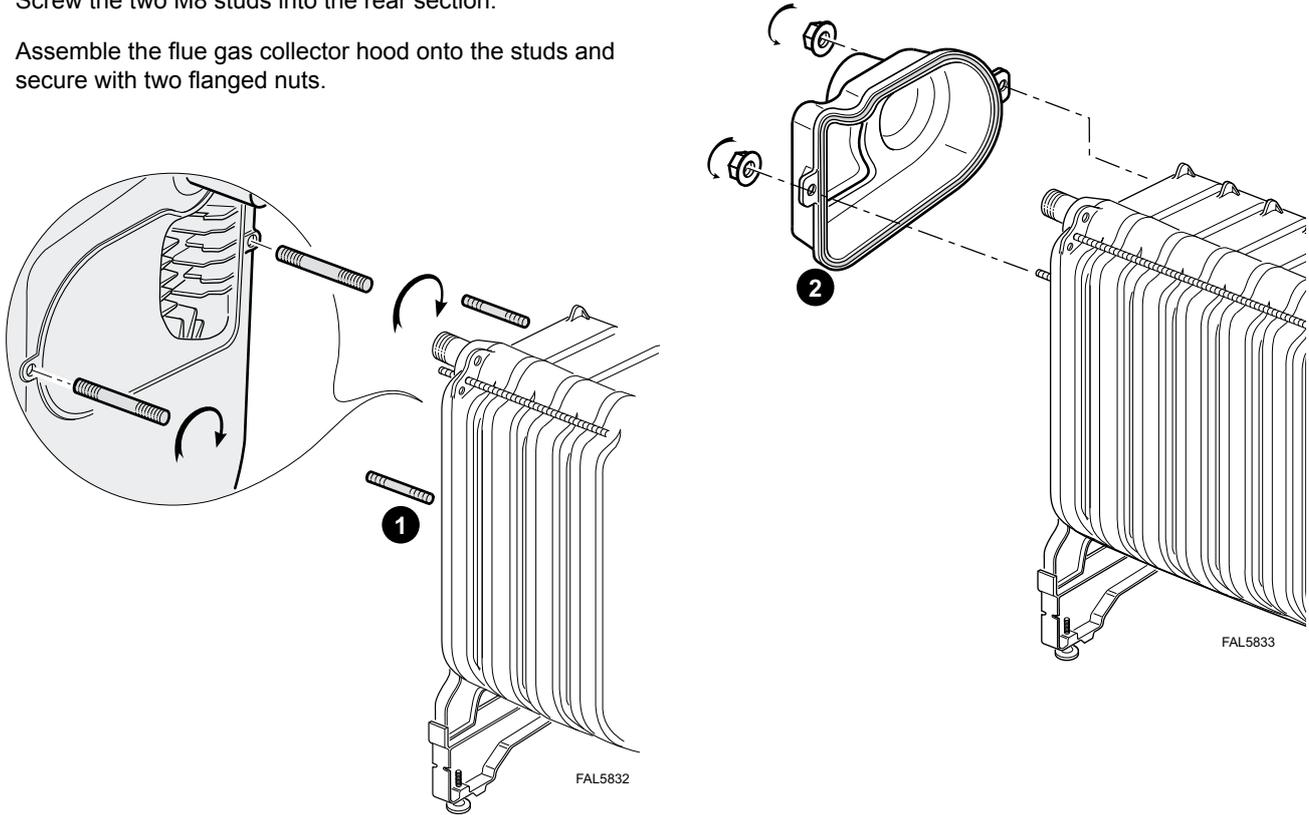
Boiler	A	B	C	D	E
GTS4	X		X	X	
GTS5	X		X	X	
GTS6	X	X	X	X	X
GTS7	X	X	X	X	X
GTS8		X	X	X	X



# INSTALLATION

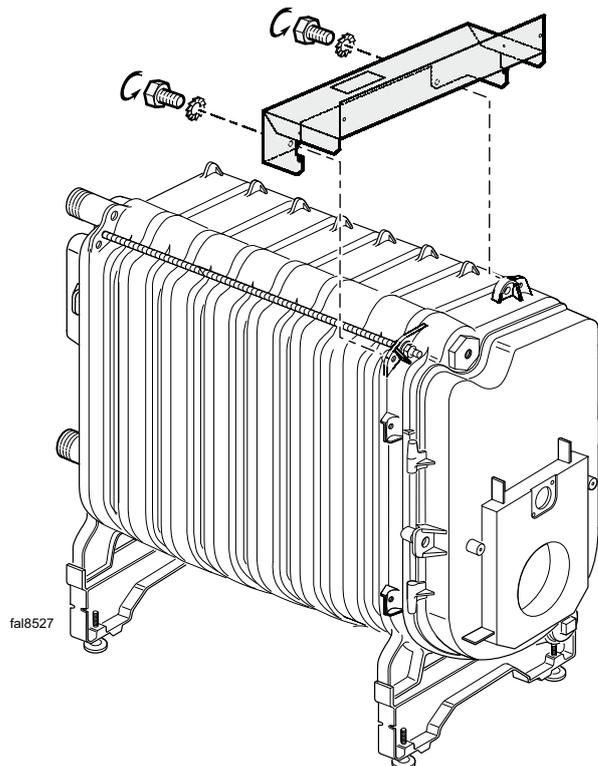
## 23 FITTING THE SMOKEHOOD

1. Screw the two M8 studs into the rear section.
2. Assemble the flue gas collector hood onto the studs and secure with two flanged nuts.



## 24 FITTING THE FRONT CROSSPIECE

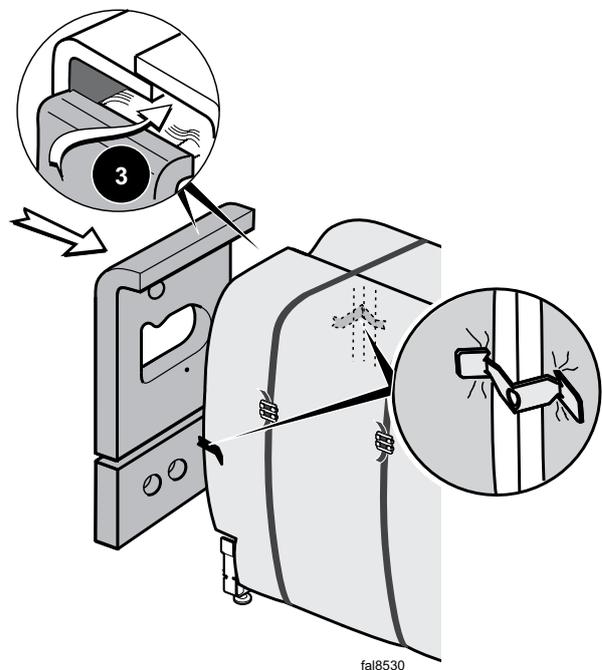
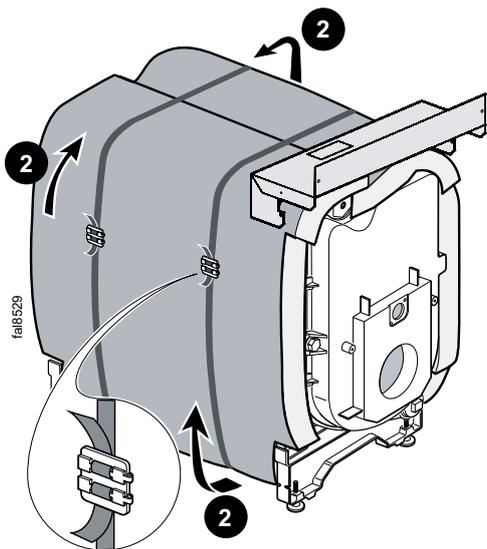
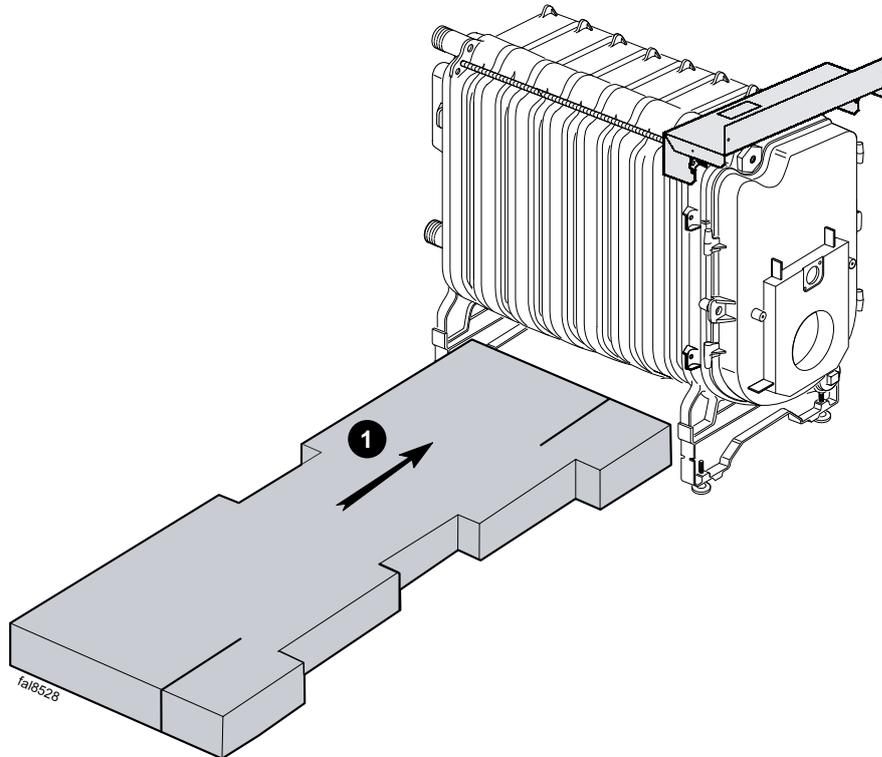
1. Lower the crosspiece onto the boiler body.
2. Push it home behind the lugs.
3. Secure it to the front section with two M8 bolts and serrated washers by screwing into the cast iron lugs.



# INSTALLATION

## 25 INSTALLING THE INSULATING MATERIAL

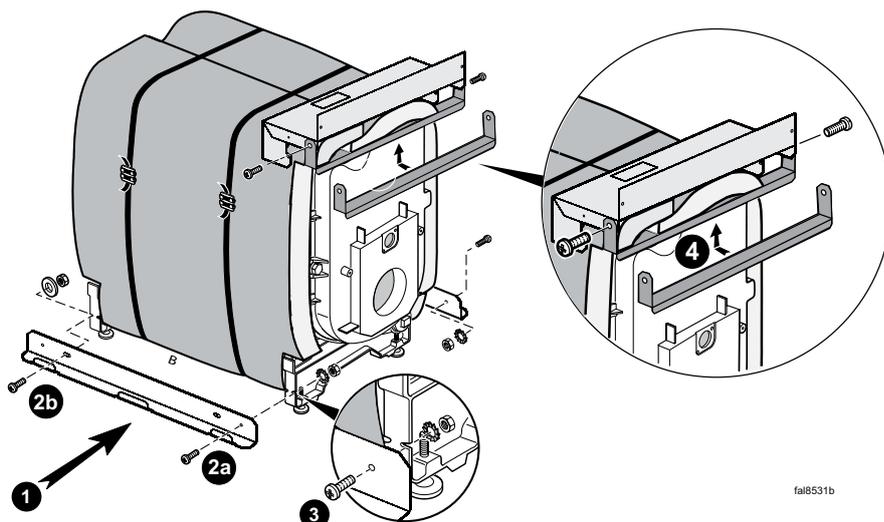
1. Place the insulating material under one side of the boiler with the black fabric facing downwards.
2. Lift the insulating material around the body and fix it with two straps and bundles.
3. Mount the lower and upper rear insulating material, with the top folded in towards the boiler at a 90° angle.
4. Secure using the fasteners by folding.



## INSTALLATION

### 26 FITTING THE SIDE PANEL AND INSULATION SUPPORTS

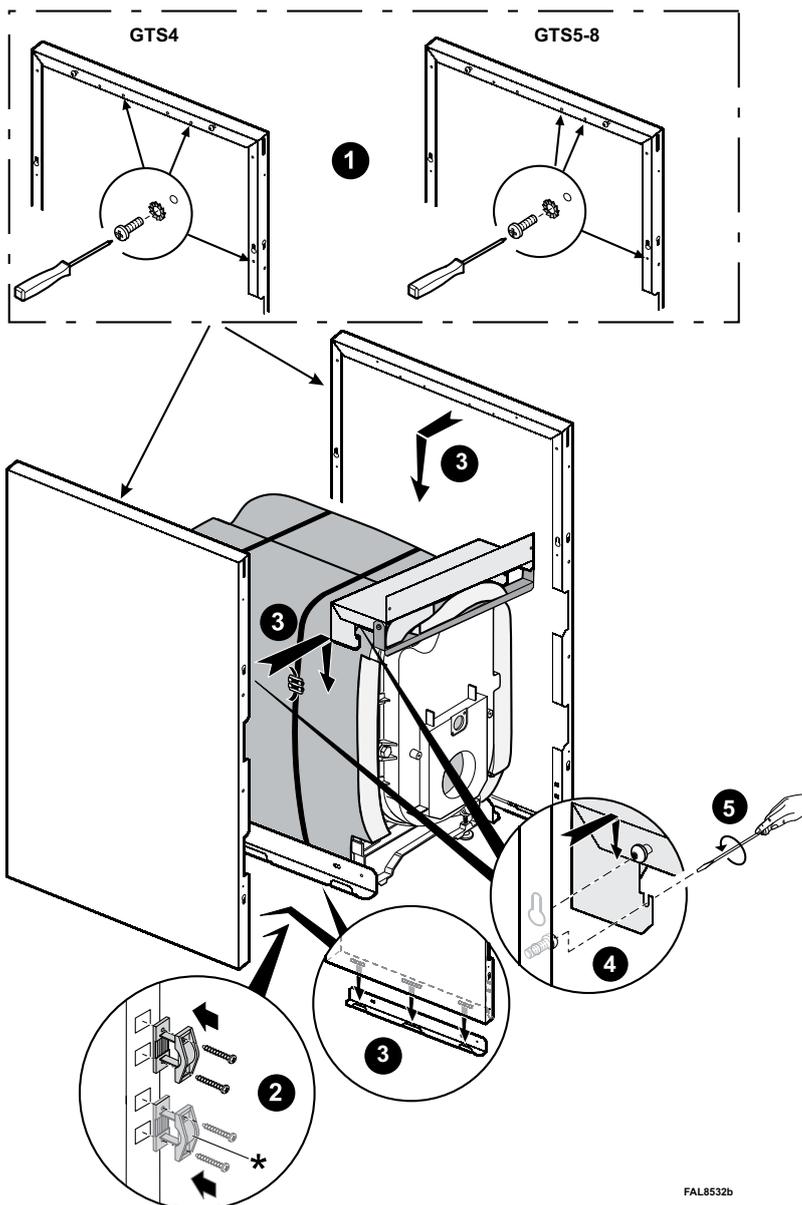
1. Place the two lower side panel supports into position (using the round hole towards the front and the oblong hole towards the back of the boiler).
2. Fix:
  - a. to the front with a screw, serrated washer and nut.
  - b. To the rear with a screw, LL washer and nut.
3. Screw the screws home into the notch of the front height converters.
4. Fix the insulation support with screws to support the front of the insulation material.



### 27 ASSEMBLING THE SIDE PANELS

1. Loosely fit the screws and serrated washers (a) to secure the control panel support and (b) to secure to the front cross piece. Refer to Frame 26.
2. Fit the cable clip on the opposite side to the furnace door hinges (in compliance with the requirements of European safety standards).
 

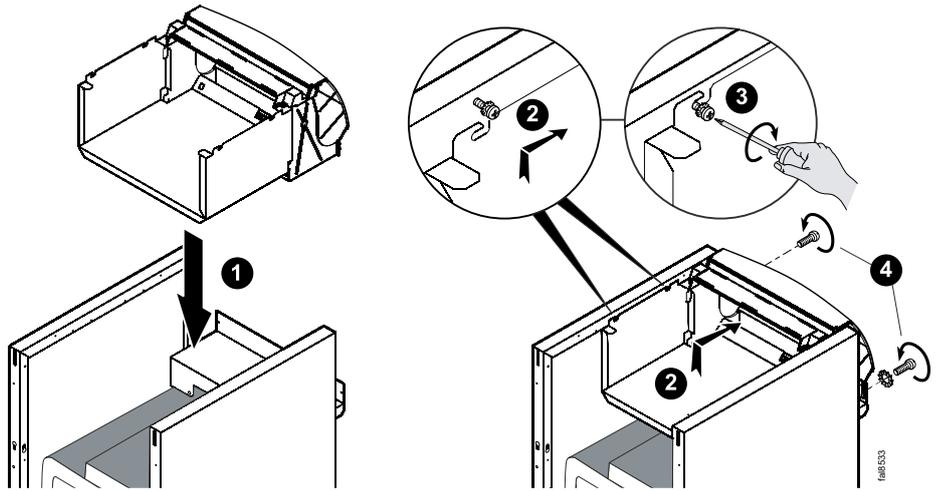
\* Only for High/Low control panel FM196: Fit the 2 cable clips. The second cable clip is delivered in package FM196.
3. Insert the side panels from the bottom into the notches on the lower side panel supports.
4. Slightly lift the panels and engage the loose screws into the notches on the front cross piece
5. Tighten the screws into the front cross piece.



# INSTALLATION

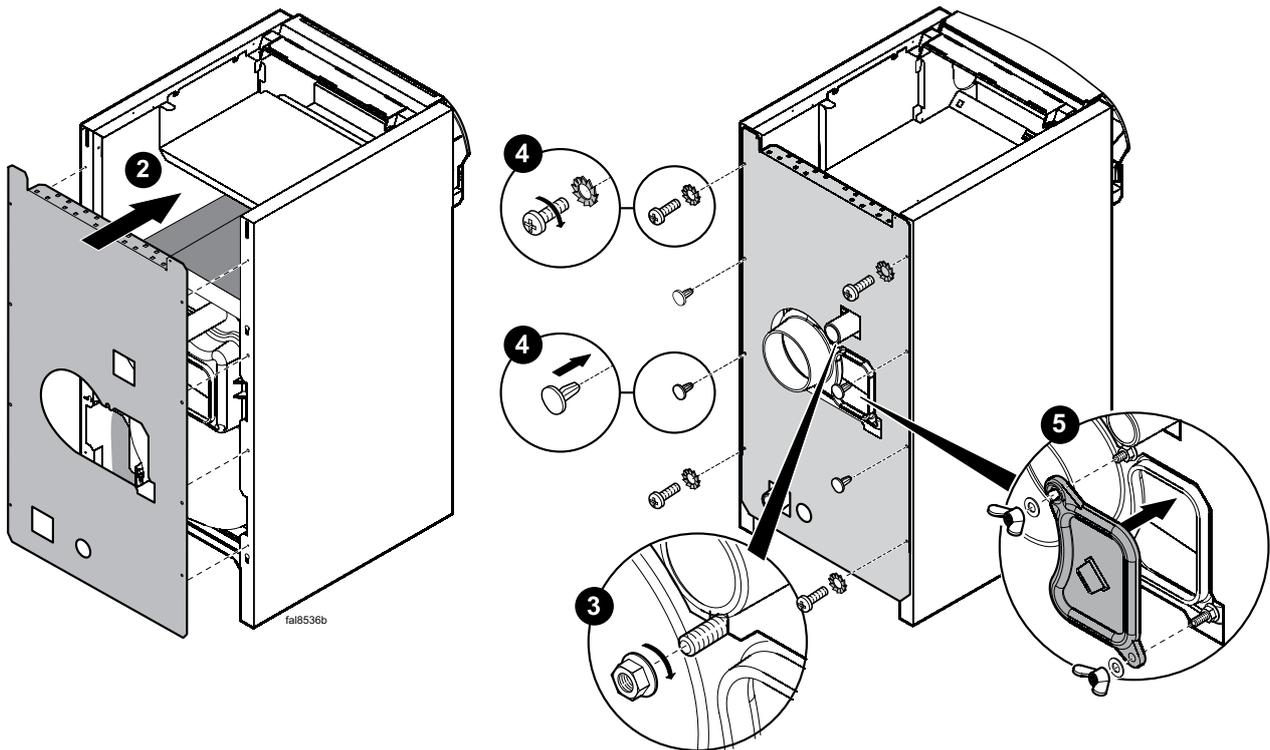
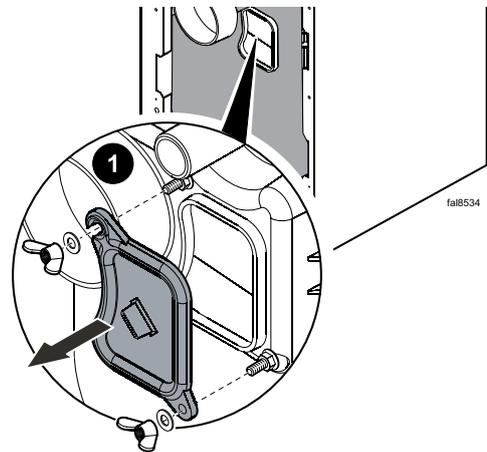
## 28 FITTING THE CONTROL PANEL SUPPORT

1. Lower the control panel support between the casing sides and onto the front cross piece.
2. Slide the control panel support forwards to engage on the loose screws.
3. Tighten the screws in the side panels.
4. Secure at the front, using two screws and serrated washers, into the front crosspiece.



## 29 FITTING THE REAR PANEL

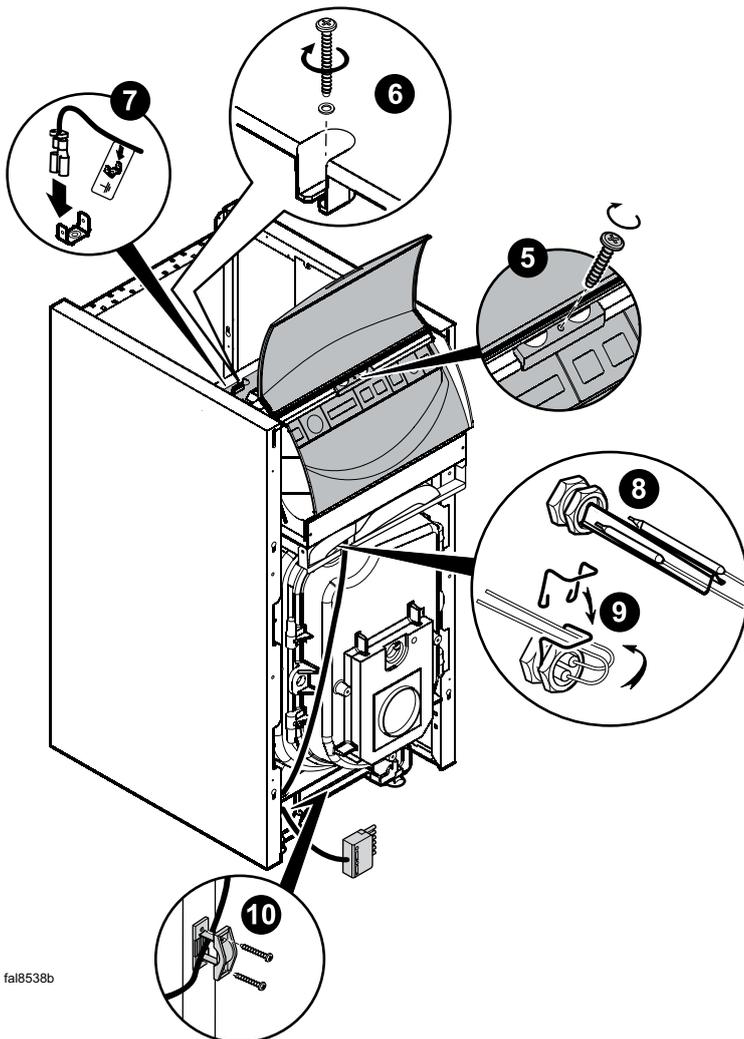
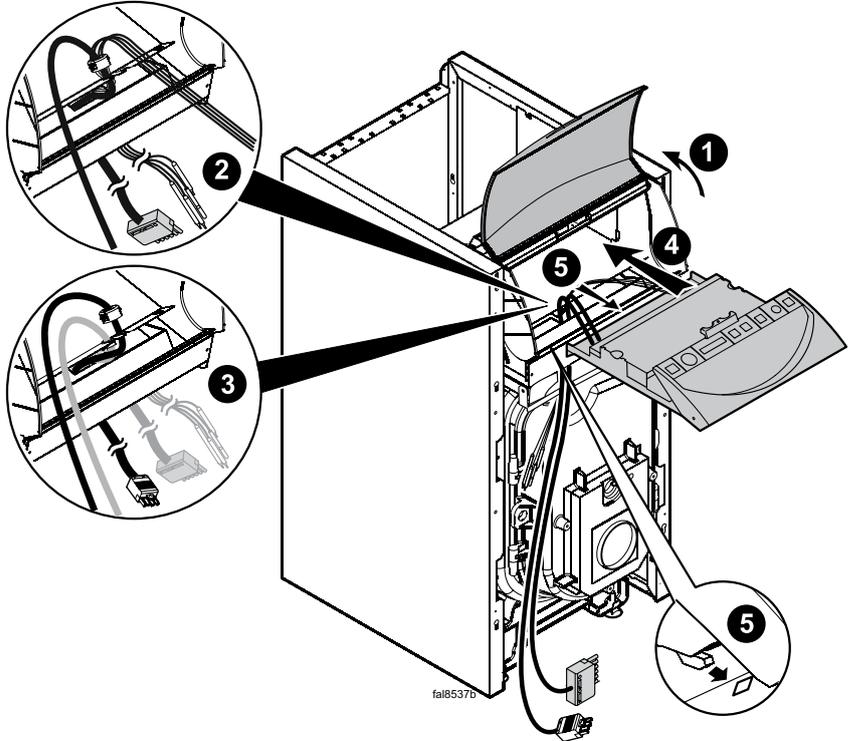
1. Remove the collector hood inspection plate by removing the wing nuts and washers.
2. Place rear panel into position ensuring notch in centre of panel engages on stud.
3. Secure rear panel to stud using nut. (fit loosely and tighten after fitting screws in 4 below).
4. Secure rear panel to side panels using plastic push studs and screws and serrated washers.
5. Replace collector hood inspection plate and secure with wing nuts and washers.



# INSTALLATION

## 30 INSTALLING THE CONTROL PANEL (Securing Burner Cable(s) and Sensors)

1. Lift the window.
2. Fit grommet over burner cable and sensor cables and engage grommet into notch in control panel support
3. Only for control panel No FM196. Fit second grommet over second burner cable and engage into notch in control panel support.
4. Slide the control panel into the opening.
5. Pull the control panel forwards to engage the lugs and secure the top part using the black screw for plastic.

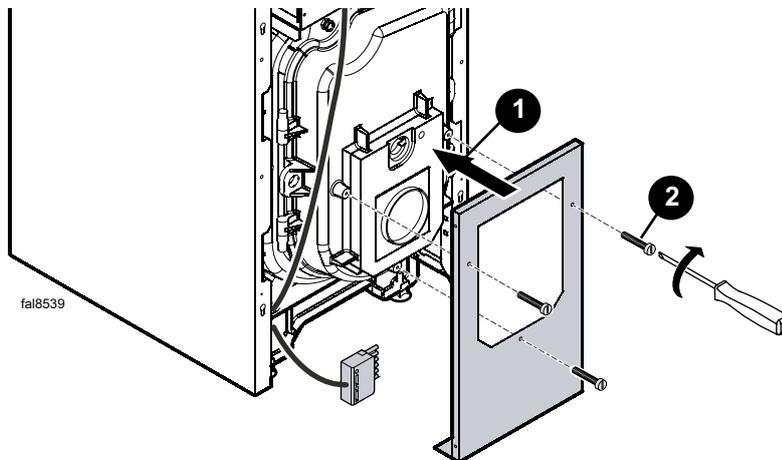


6. Fit the back of the control panel to the panel support using the self tapping screw and plain washer.
7. Fit the earth wire spade connector to the earth tab.
8. Insert the sensors into the pocket.
9. Loop the leads over and secure with the spring clip.
10. Route the burner cable(s) and secure in place in the cable clamp. Adjust the length of the cable so that it is necessary to disconnect the burner cable(s) to open the combustion chamber door. Slide the surplus cable(s) backwards between the insulation and the side panel.

**CAUTION: The burner cable(s) MUST be routed on the opposite side to the hinges of the combustion chamber door (as required under European standards).**

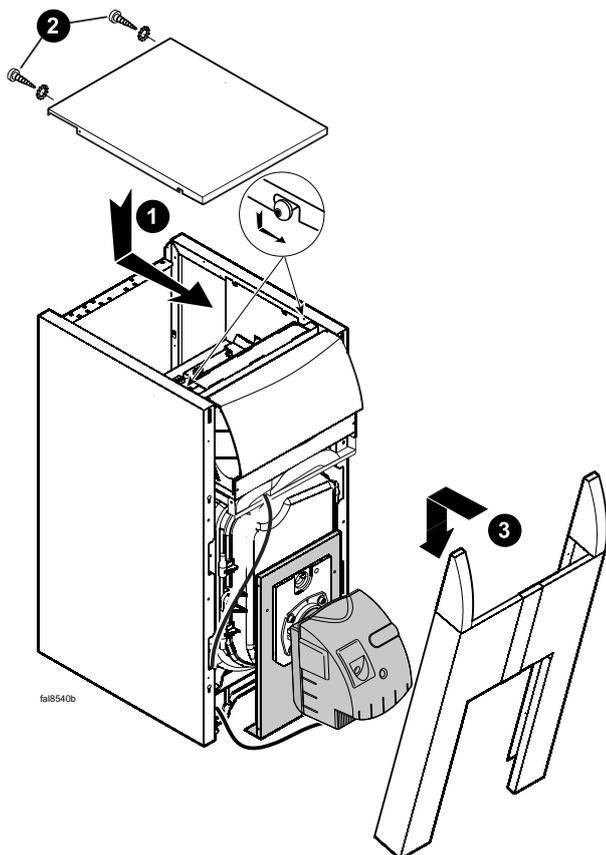
## 31 FITTING COMBUSTION CHAMBER FRONT PANEL

1. Locate panel over combustion chamber door.
2. Secure with the 3 screws.



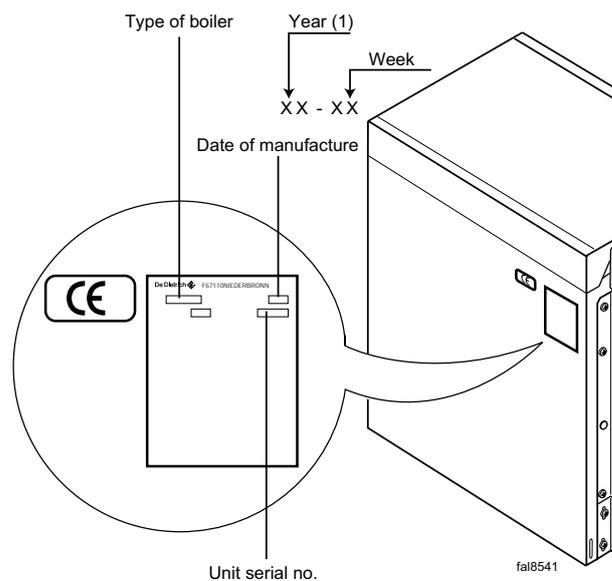
## 32 FITTING THE TOP AND FRONT PANELS

1. Lower the top panel onto the studs on the side panels and push forwards to engage.
2. Secure the top panel to the rear panel with 2 screws and serrated washers.
3. Position the front panel so that the studs engage in the side panel keyhole slots. Lower the panel to engage.



## 33 NAMEPLATE

Affix the identification plate and CE label (supplied in the instructions bag) on the casing (on the left or right-hand side) in an easily accessible location.



# INSTALLATION

## 34 CONTROL PANEL

Electrical control panel, equipped with temperature control. (Priority for domestic hot water production as original equipment if DHW sensor option fitted.)

**The control panel carton contains:**

- 1 control panel
- 1 boiler water temperature sensor.

The control panel incorporates a boiler thermostat controller, a domestic hot water thermostat controller, an electronic thermometer and a safety thermostat.

**The boiler thermostat** - controls the boiler operating temperature.

**The safety thermostat** (with manual reset) - if the boiler temperature rises abnormally (110°C), the safety thermostat cuts off the burner electricity power supply.

**WARNING.** In this case, you must call your installer.

**The domestic hot water thermostat** - if DHW sensor kit is not fitted then the control operation is nullified and only the boiler flow temperature is shown on the display. If DHW sensor kit (AD 212) is fitted then the thermostat is used to adjust the average domestic hot water storage temperature giving priority to preparation of domestic hot water.

The domestic hot water priority activates the burner and the DHW load pump and stops the central heating pump whenever a domestic hot water heating request is received. During summer conditions, the boiler temperature is not maintained between hot water requests. The domestic hot water temperature is measured by the DHW sensor and shown on the display.

## 35 TECHNICAL CHARACTERISTICS - SENSORS

Value of water sensors (boiler and domestic hot water)

Thermostat Knob setting	Temperature in °C	Resistance in ohm	Thermostat Knob setting	Temperature in °C	Resistance in ohm
			5	50	3,661
1	10	19,691	6	60	2,535
2	20	12,474	7	70	1,794
3	30	8,080	8	80	1,290
4	40	5,372	9	90	941

## 36 ELECTRICAL CONNECTIONS

**WARNING.** The electrical connections must be made by a qualified professional. The electrical wiring has been carefully checked in the factory and the internal connections of the control panel must not be modified in any event.

The electrical connections should be made following the information shown on the electrical diagrams delivered with the unit and the directions given in the instructions.

The electrical connection must comply with standards in force. The equipment must be powered by a circuit containing a remote double-pole switch with opening  $\geq 3\text{mm}$ .

**WARNING.** The boiler must be earthed. Ensure earth wire from control panel is fitted to earth tab.

All connections must be made using the terminal blocks provided for this purpose at the back of the boiler control panel.

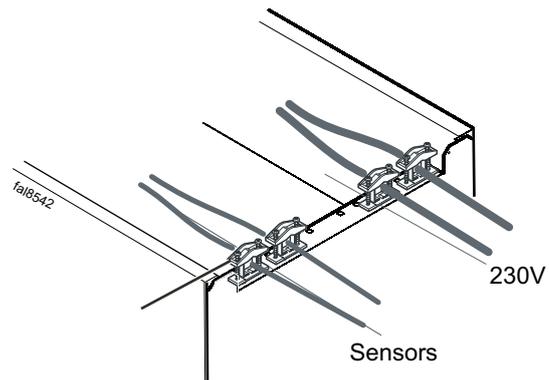
Connections cables are brought inside the boiler through cut-outs provided in the boiler back panel, which are large enough for the use of commercially available conduit if required.

These cables are secured at the back of the control panel using cable clamps that are to be installed on the sheet metal.

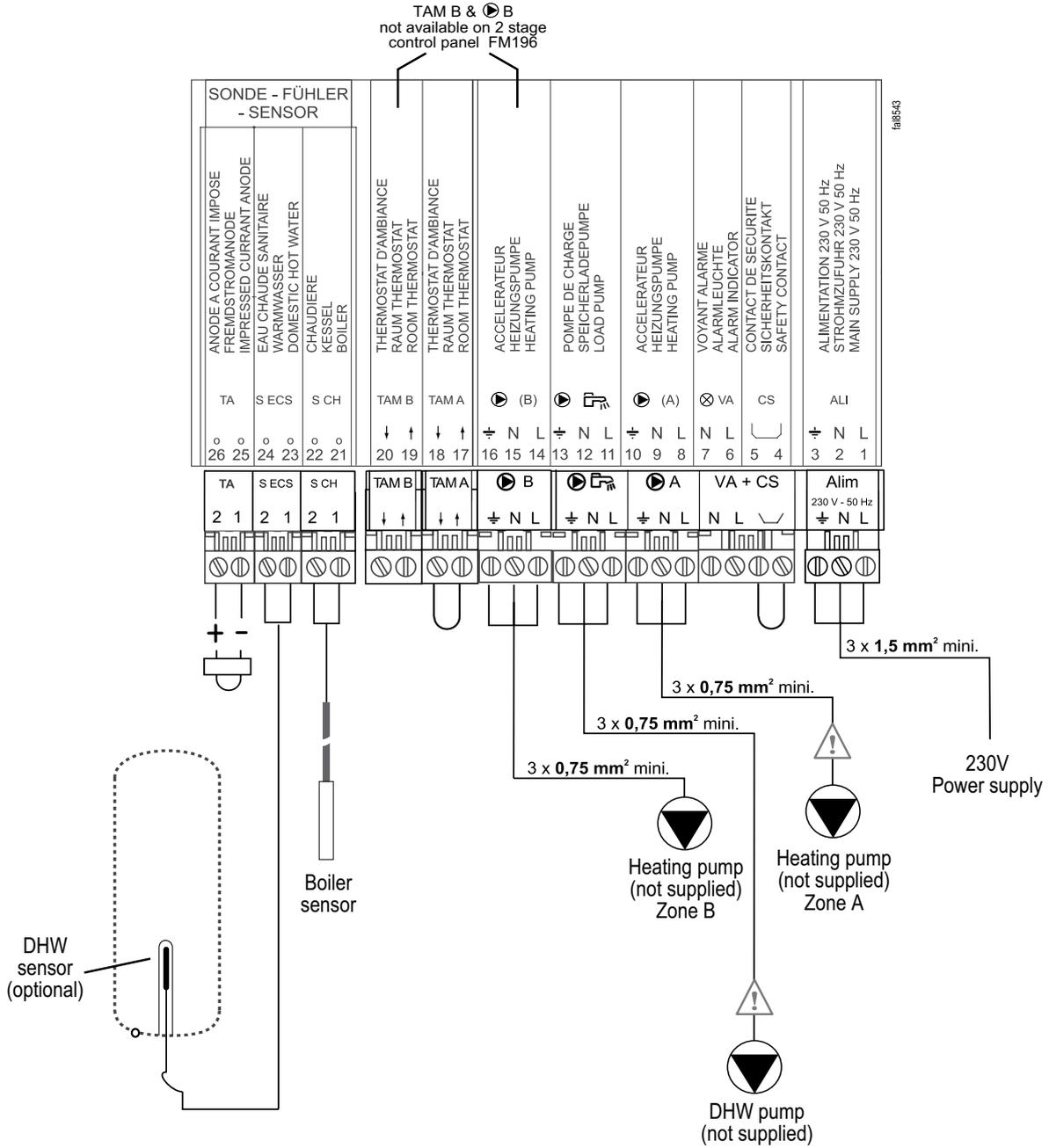
**IMPORTANT.** The maximum current that can be switched per output is  $2\text{A} \cos. \varphi = 0,7$  (Max. power 450W, start current less than 16A).

**WARNING.** Sensor cables must be separated from cables in 230V circuits.

- In the boiler: use two cable glands on each side of the boiler for this purpose.
- Outside the boiler: use two cable ducts or cable ways with a minimum distance of 100mm between them.



## 37 BASIC CONNECTIONS



The connector supplied in the AD 212 kit with the 22kOhm resistance and a 100nF capacitor, must be plugged into terminals 25 and 26.

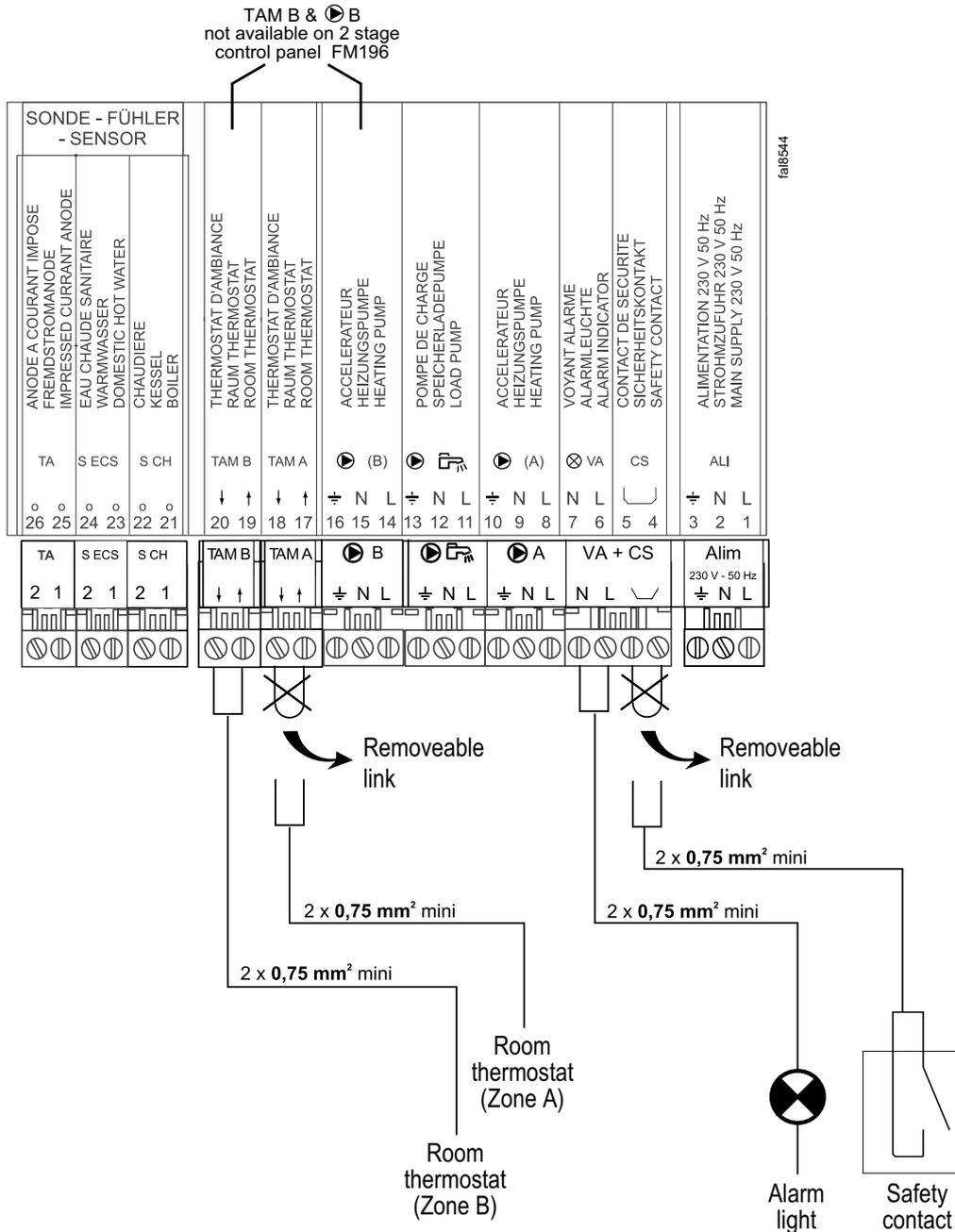
**WARNING.** Sensor cables must be separated from cables in 230V circuits (see Frame 36).

# INSTALLATION

## 38 CONNECTIONS OF COMPONENTS (NOT SUPPLIED)

Additional system components may be wired as follows:

- Room thermostat at terminals 17 and 18 after removal of link (zone A).
- Room thermostat at terminals 19 and 20 zone B (do not fit link if zone B not used).
- Safety contact to terminals 4 and 5 after removing link.
- Remote alarm to indicate overheat, low water pressure etc. to terminals 6 and 7.

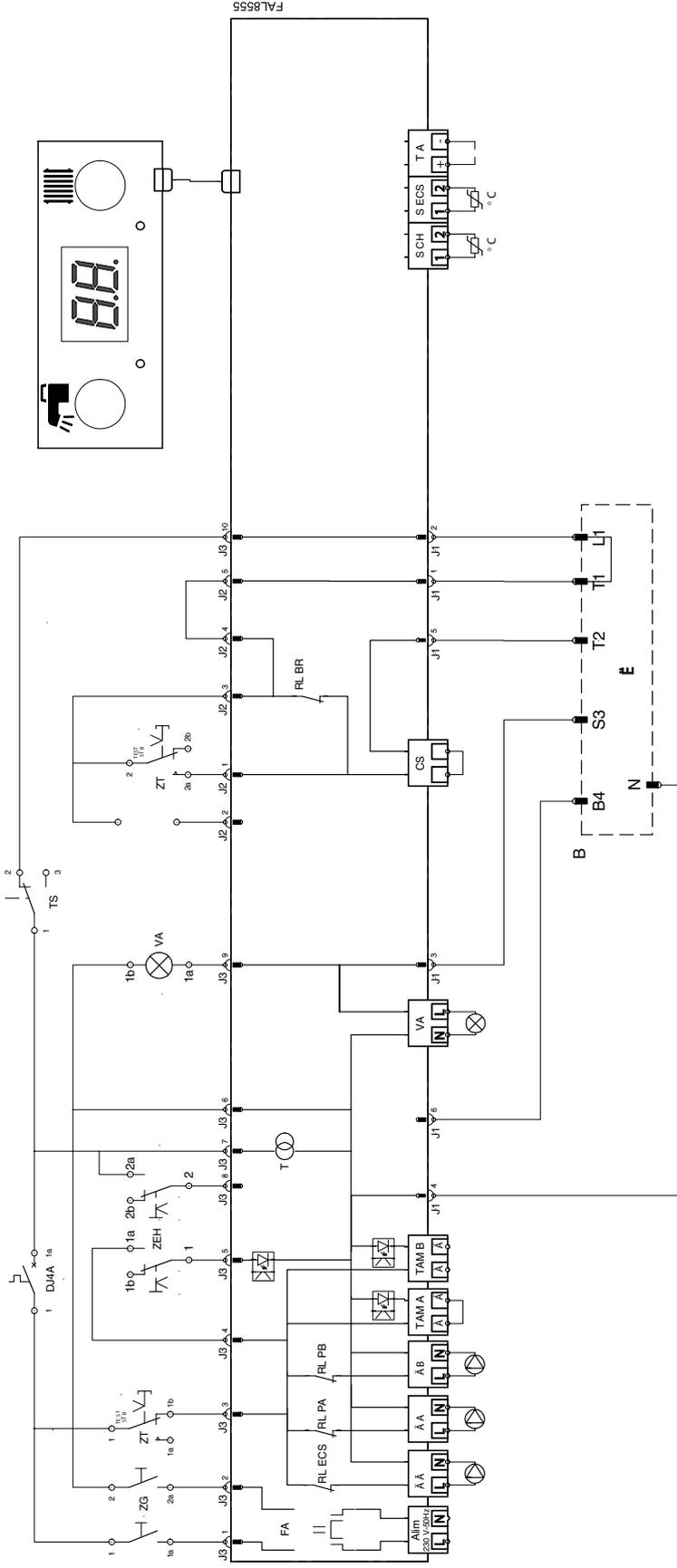


If only one circuit is used, connect the room thermostat to circuit A and DO NOT fit link connector TAM B.

**WARNING.** Sensor cables must be separated from cables in 230V circuits (see Frame 36).

# INSTALLATION

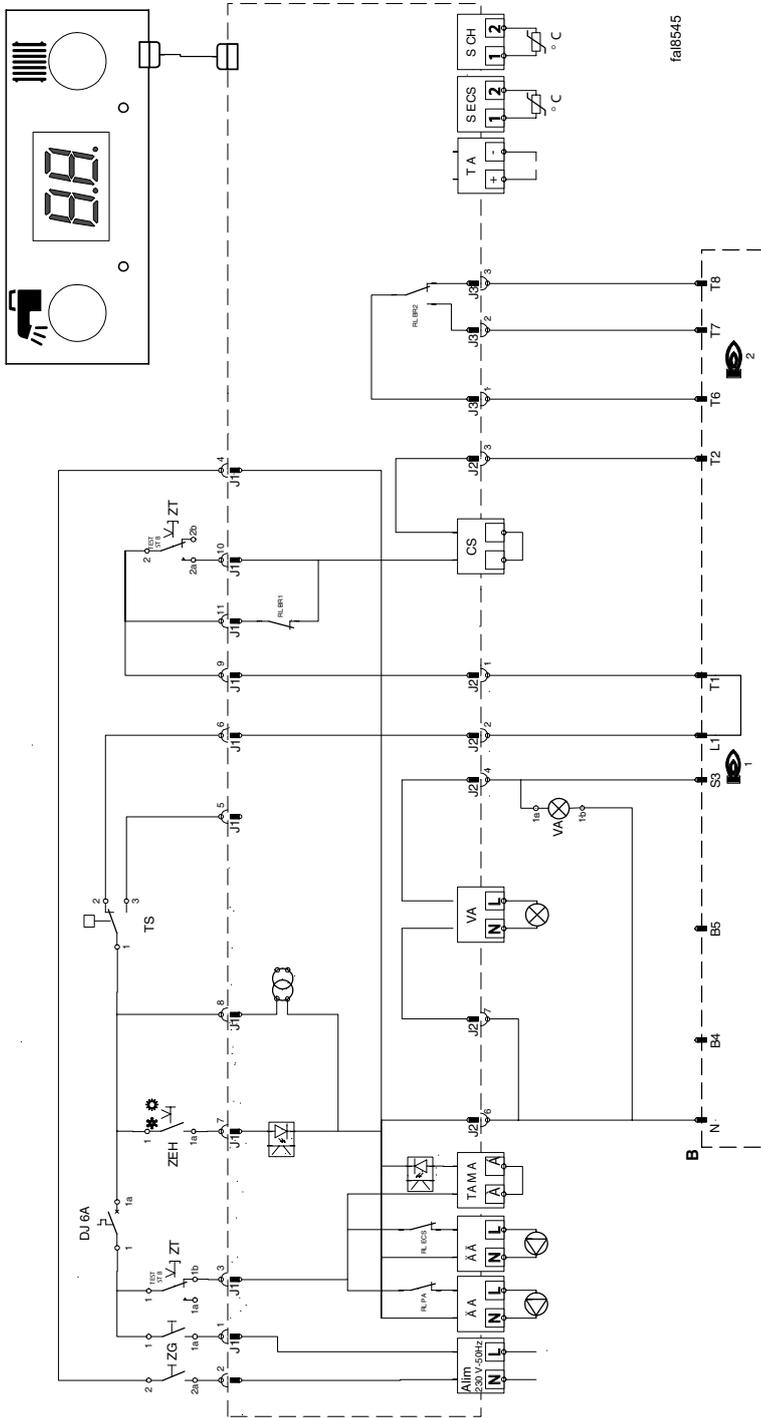
## 39 WIRING DIAGRAM (On-Off Control - FM195 Control Panel - All Models)



- |        |                               |        |                                      |
|--------|-------------------------------|--------|--------------------------------------|
| ● A    | HEATING PUMP CIRCUIT A        | RL PA  | HEATING PUMP CONTROL RELAY CIRCUIT A |
| ● B    | DHW (LOAD) PUMP               | RL PB  | HEATING PUMP CONTROL RELAY CIRCUIT B |
| ● B    | HEATING PUMP CIRCUIT B        | S CH   | BOILER SENSOR                        |
| B      | BURNER                        | S SECS | DOMESTIC HOT WATER SENSOR            |
| CS     | SAFETY CONTACT                | TA     | TITANIUM ANODE                       |
| DJ4A   | CIRCUIT BREAKER               | TAM A  | ROOM THERMOSTAT CIRCUIT A            |
| FA     | SUPPRESSOR                    | TAM B  | ROOM THERMOSTAT CIRCUIT B            |
| J      | PRINTED CIRCUIT CONNECTOR     | TS     | SAFETY THERMOSTAT                    |
| L      | LINE                          | VA     | ALARM LIGHT                          |
| N      | NEUTRAL                       | ZG     | MAIN SWITCH                          |
| RL BR  | BURNER CONTROL RELAY          | ZEH    | SUMMER/WINTER SWITCH                 |
| RL ECS | DHW (LOAD) PUMP CONTROL RELAY | ZT     | TEST SWITCH                          |
|        |                               | Alim   | MAINS SUPPLY                         |

# INSTALLATION

## 40 WIRING DIAGRAM (High/Low Control - FM196 Control Panel - Models GTS 7 and GTS 8 only)



fal8545

- ▶ A HEATING PUMP CIRCUIT A
- ▶ B DHW (LOAD) PUMP
- ▶ B HEATING PUMP CIRCUIT B
- B BURNER
- CS SAFETY CONTACT
- DJ6A CIRCUIT BREAKER
- J PRINTED CIRCUIT CONNECTOR
- L LINE
- N NEUTRAL
- RL BR1 BURNER 1st STAGE CONTROL RELAY
- RL BR2 BURNER 2nd STAGE CONTROL RELAY
- RL ECS DHW (LOAD) PUMP CONTROL RELAY
- RL PA HEATING PUMP CONTROL RELAY CIRCUIT A
- RL PB HEATING PUMP CONTROL RELAY CIRCUIT B
- S CH BOILER SENSOR
- SECS DOMESTIC HOT WATER SENSOR
- TA TITANIUM ANODE
- TAM A ROOM THERMOSTAT CIRCUIT A
- TS SAFETY THERMOSTAT
- VA ALARM LIGHT
- ZG MAIN SWITCH
- ZEH SUMMER/WINTER SWITCH
- ZT TEST SWITCH
- Alim MAINS SUPPLY

**WARNING.** The manual/Auto/Test Switch may be put in either the Manual or Auto position for normal operation

# INSTALLATION

## 41 WIRING HARNESS (On-Off Burner Control)

The burner control circuit is fitted with a cable with a 7-pin European connecting plug which can be fitted directly to burners fitted with connector sockets.

In the case of a burner not fitted with sockets, remove the plugs on the burner cable from the boiler and connect the leads to the terminal bar on the burner, proceeding as follows:

Refer to No (9) [1], No (8) [N], No (7) T1, No (6) T2, No (10)S3 and g/y. i.e plug for single stage burner. (See Frame 42.)

## 42 WIRING HARNESS (High/Low Burner Control)

The burner control circuit is fitted with a cable with two standard European connecting plugs which can be fitted directly to burners fitted with connector sockets. In the case of a burner not fitted with sockets, remove the plugs on the burner cable from the boiler and connect the leads to the terminal bar on the burner, proceeding as follows:

No (9) [1] Control circuit phase interrupted in panel by safety Thermostat TS, Limit Thermostat TS and panel ON/OFF switch ZG. Connect to control circuit live terminal burner.

NOTE: The connection terminal for this control phase must be separate from those of the power supply phase(s) which are wired direct to the burner via the installer supplied burner mains relay.

No (8) [N] Neutral from control panel interrupted by panel ON/OFF switch. Connect to Neutral terminal of burner control box.

No (7) T1 Live feed from burner control circuit downstream of burner ON/OFF switch. Connect to live side of first stage control thermostat (High temperature setting).

No (6) T2 Return from 1st stage control thermostat (High temperature setting). Live on this lead, hence on T2 allows burner to fire on low fire in a 2 stage burner.

No (10)S3 Burner lock indicator. Feeds signal from lockout terminal on burner control box to lock out indicator

on boiler control panel.

No (4) B4 Feed to 1st stage operating indicator from burner low fire control. Indicates low fire in operation. Essentially feed back from live on No (6) T2.

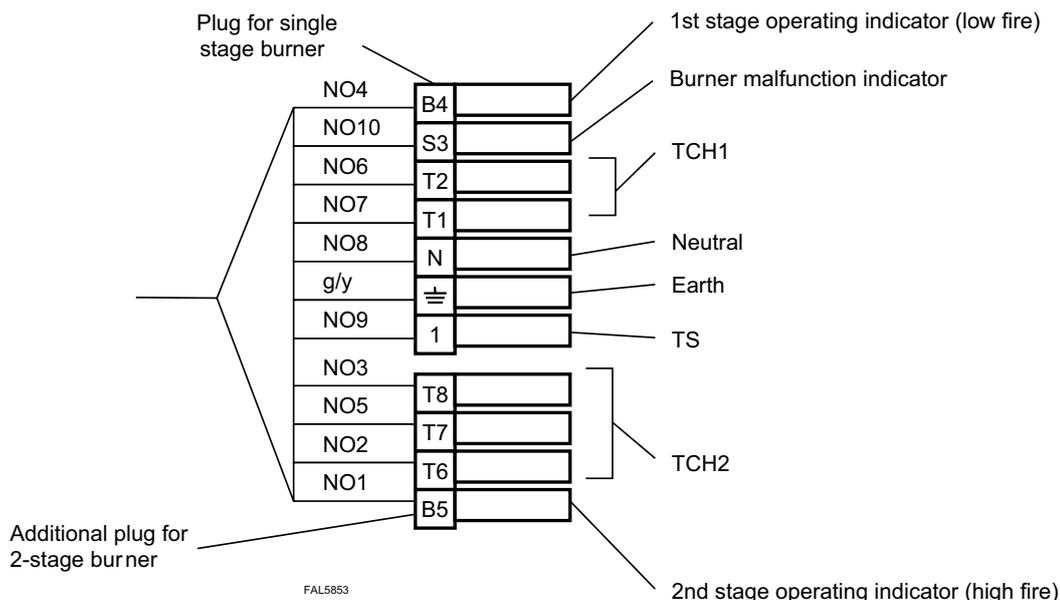
No (2) T6 Live feed from burner control circuit downstream of burner ON/OFF switch. Connects to live side of 2nd stage control thermostat (Low setting thermostat).

No (3) T8 Return from 2nd stage control thermostat (low temperature setting). Live on this lead, hence on T8 allows burner to fire on high fire in a 2 stage burner.

No (5) T7 Back contact from 2nd stage control thermostat (low temperature setting). Live on this lead, hence T7 indicates high fire out of operation (used for modulating burners only).

No (1) B5 Feed to 2nd stage operating indicator from burner high fire control to boiler panel. Indicates high fire in operation. Essentially feed back from live on No (3) T8.

g/y Earth.

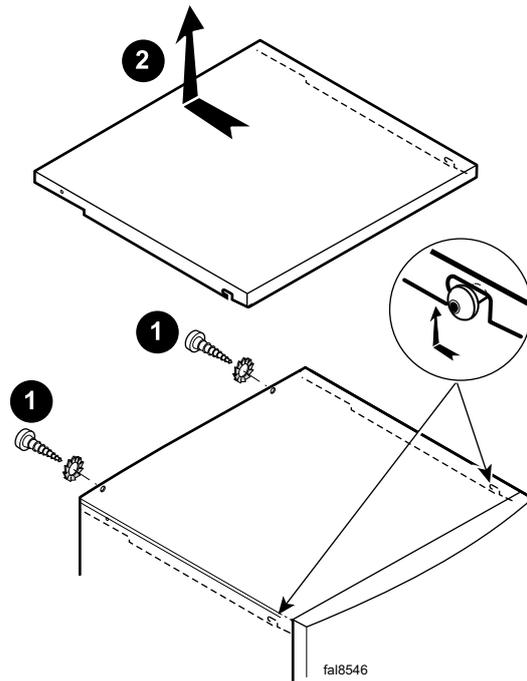
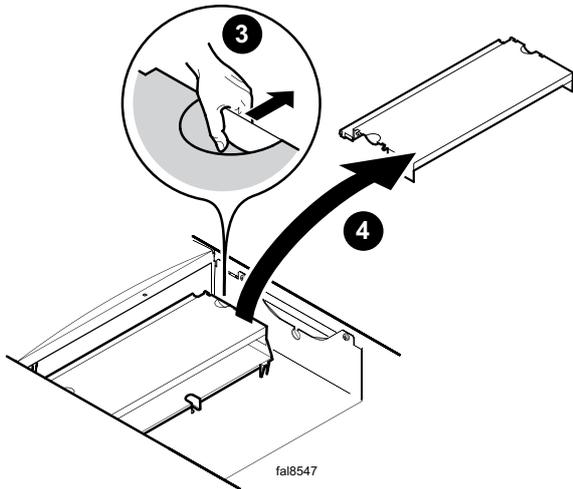


# INSTALLATION

## 43 SETTINGS (IF DHW SENSOR OPTION FITTED)

Access to DHW pump overrun adjustment potentiometers and the DHW load temperature limiter.

1. Remove Screws and washers.
2. Remove the top panel from the boiler.
3. Loosen the top protection cover from the sides.
4. Remove the PCB protection cover.



## 44 SETTING THE DHW PUMP OVERRUN AND LOAD TEMPERATURE LIMITER

### Setting the DHW Pump Overrun

1. The potentiometer on the PCB in the boiler is used to adjust the DHW pump overrun.

The overrun can vary with an adjustment range from 0 to 10 minutes (factory setting 4 min.)



### Setting the Domestic Hot Water Load Temperature Limiter

2. The potentiometer on the P.C.B. in the boiler is used to adjust the boiler temperature while heating domestic hot water.

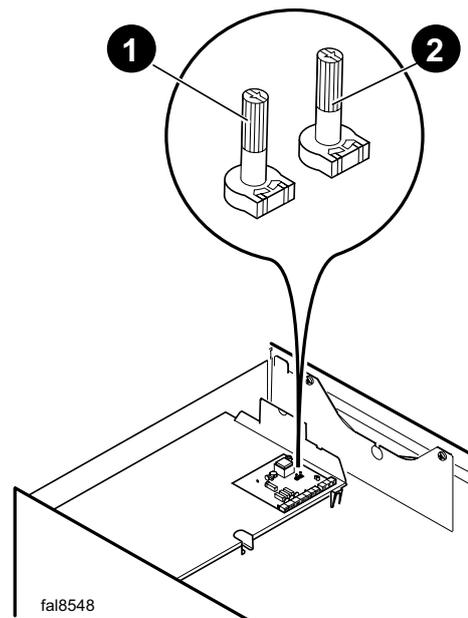
The load temperature setting can vary from 60 to 90°C (factory setting 75°C).



### Reassembly

3. At the end of the work, reassemble the P.C.B. protection cover and the top panel, as for access (Frame 43), but in the reverse order.

**Note.** Do not omit the serrated washers.



## INSTALLATION

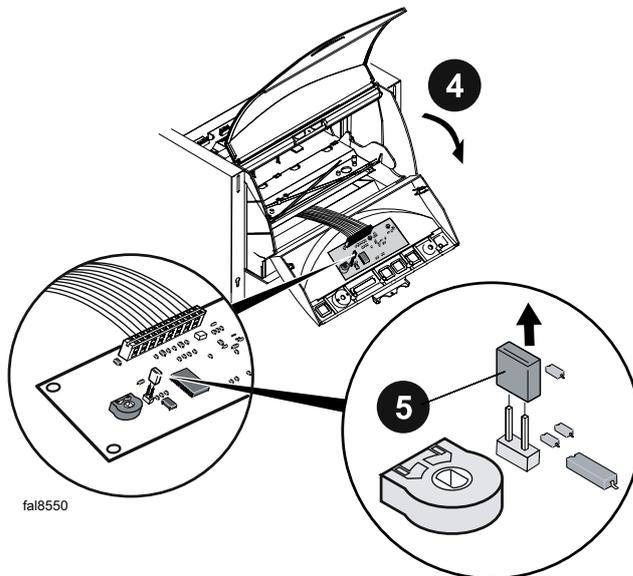
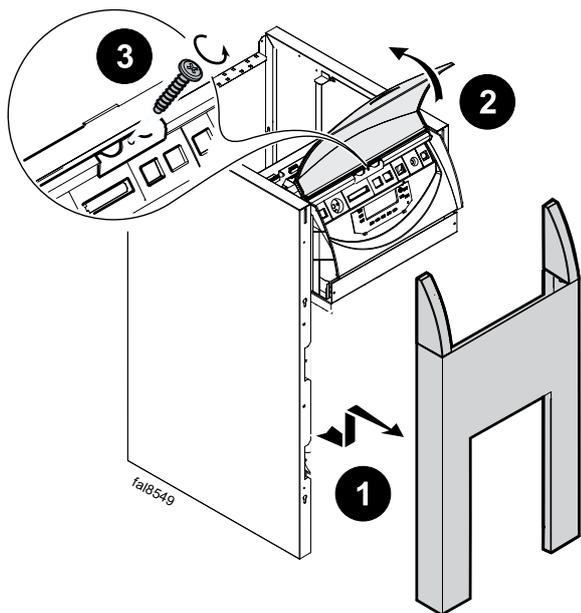
### 45 DEACTIVATING THE DOMESTIC HOT WATER PRIORITY

When the domestic hot water priority is deactivated, heating is not cut off during domestic hot water heating phases.

- Switch off the boiler power supply.
- Gain access as follows:

1. Remove the front panel (lift and pull).
2. Lift the window.

3. Unscrew the attachment screw fastening the front of the control panel.
4. Tilt the front panel.
5. Remove the shunt (bridge).
6. Close the control panel and put the front panel back into position, using the same procedure as for disassembly in the reverse order.



### 46 HEATING PUMP OVERRUN

The heating pump overrun is fixed at 12 minutes after the room thermostat is satisfied or changing to summer mode.

### 47 FUEL OIL OR GAS CONNECTIONS

Refer to the instructions supplied with the burner.

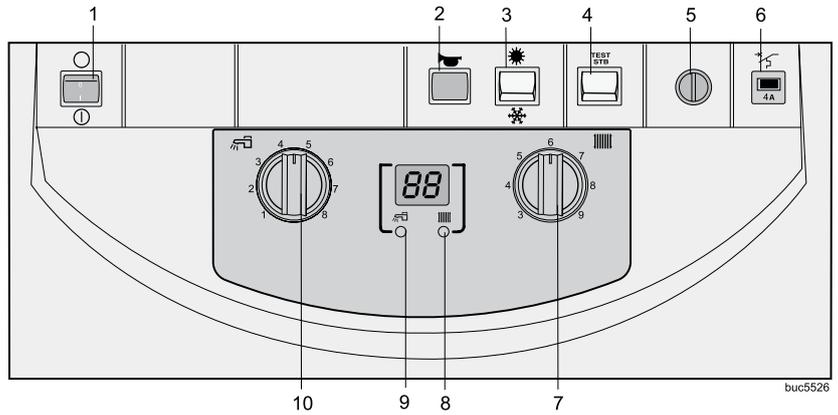
# INSTALLATION

## 48 COMMISSIONING

**IMPORTANT.** Domestic hot water circuits (if they exist) and heating circuits must have been filled and bled, and leak tightness tests must have been carried out on them, in accordance with the instructions for the domestic hot water calorifier (if existing) and boiler.

Refer to the following instructions to start up the boiler:

- the instructions delivered with the burner.
- the instructions delivered with the domestic hot water calorifier, (if existing).



### 1 Boiler on/off switch

Position ..... ON    Position .....OFF

### 2. Alarm light

Comes on when the burner is in safety lockout

### 3. Summer/Winter switch

**Winter** Start the CH pump and DHW pump if fitted.

**Summer** The CH pump stops 12 minutes after the changeover to summer mode.

### 4. Test-STB button

When held in the pressed position it tests the safety thermostat and cuts off the pump(s)

### 5. Safety thermostat (with manual reset) Set to 110°C

### 6. Timed circuit breaker

(4A in control panel FM195, 6A in control panel FM196)

### 7. Electronic thermostat

Adjustment of the boiler flow temperature, 30 - 90°C

### 8. Light on

Indicates the display above it is showing the boiler flow temperature

### DOMESTIC HOT WATER

(Boilers fitted with a DHW sensor)

Items 9 & 10 only.

#### 9. Light on

Indicates the display above it is showing the DHW temperature.

#### 10. Electronic thermostat

Adjustment of the average DHW storage temperature, 10 - 80°C.

**Notes for items 9 & 10 only.**

**Boilers fitted with a DHW sensor.** When the system is switched on it performs an air elimination sequence of the hot water calorifier lasting for 1 minute, by intermittently operating the DHW load pump and the CH pump. This air elimination sequence is de-activated if the calorifier temperature is more than 25°C

**Summer/Winter Switch.** If DHW has been in demand, a delay of approx. 1 minute will occur for the change from the DHW pump to the CH pump, after the changeover to Winter mode.

**MESSAGES - ALARMS** The display may show the following messages in the case of a malfunction:

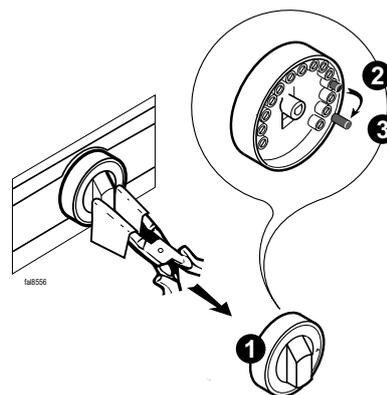
Message	Failure	Component	Probable Cause	Remedy	Notes
<b>AL50</b>	Installation stops	Boiler sensor	The corresponding sensor circuit is interrupted or is short circuited	Inform the installer	If the power supply is interrupted with an <b>AL52</b> alarm and no corrective action is taken then, when the power is resumed, the boiler will restart but continue to operate in a CH mode only and alarm <b>AL50</b> will NOT be displayed.
<b>AL52</b>	Installation continues to operate but DHW no longer heated	DHW sensor			
<b>AL62</b>	No DHW	AD212 kit connector	The calorifier is empty or incorrectly fitted AD212 kit connector	Fill the calorifier or check connector is properly fitted.	The DHW may be reactivated for 24 hours by disconnecting and reconnecting the power supply to the boiler.  Check that the connector supplied in the AD 212 kit (DHW Sensor), which has a 22k Ohm resistance and a 100nF capacitor fitted, is correctly connected to terminals 25 and 26.
<b>AL6c</b>				Check that there is no short circuit or the connections are made correctly	

# INSTALLATION

## 49 BOILER THERMOSTAT (Maximum Setting Adjustment)

The boiler thermostat maximum setting is factory set at 75°C. The fixed stop controlling the maximum setting is adjustable as follows:

1. Carefully remove the control knob.
2. Pull out the pin from the back of the knob.
3. Relocate in the desired position. Temperature settings are marked alongside the pin locations.
4. Carefully replace the knob ensuring that the new pin position is at the correct side of the stop.
5. Rotate the knob to the new desired maximum position to check correct setting. (The setting numbers 3-9 are approximately scaled to represent 30-90°C).



## 50 COMMISSIONING AND TESTING

### A. ELECTRICAL INSTALLATION

1. Checks to ensure electrical safety should be carried out by a competent person.
2. ALWAYS carry out the preliminary electrical system checks, i.e. earth continuity, polarity, resistance to earth and short circuit, using a suitable meter.

**WARNING.** Whilst effecting the required gas soundness test and purging air from the gas installation, open all windows and doors, extinguish naked lights and DO NOT SMOKE.

### B. FOR GAS INSTALLATION

1. The whole of the gas installation, including the meter, should be inspected and tested for soundness and then purged in accordance with the recommendations of the relevant standards listed on page 4.

## 51 INITIAL LIGHTING

1. Check that the system has been filled and the boiler is not air locked - air in the boiler could damage the heat exchanger. For this reason the air vent located in the left top side must never be shut off.
2. Check that all the drain cocks are closed and any valves in the flow and return are open.
3. Check that the GAS SERVICE COCK IS ON.
4. Unscrew the overheat reset button cap and press the reset button.
5. Set the boiler thermostat to maximum.
6. Set the summer/winter switch to the winter setting.
7. Switch the electricity supply ON and check that all the external controls are calling for heat. Set main boiler switch to on.
8. The burner will commence the ignition sequence. If the burner has failed to light then it will lock out. Press the reset button to restart the ignition sequence.
9. Operate the boiler for 20 minutes and for gas fired boilers check the gas rate (Table 1).
10. Refer to the burner instructions for specific operating features.

## 52 GENERAL CHECKS

Make the following checks for correct operation.

1. The correct operation of ANY secondary system controls should be proved. Operate each control separately and check that the main burner or circulating pump, as the case may be responds.
2. Water circulation system;
  - a. With the system HOT examine all water connections for soundness.
  - b. With the system still HOT, turn off the gas or oil burner, water and electricity supplies to the boiler and drain down to complete the flushing process.
  - c. Refill and vent the system, clear all air locks and again check for water soundness.
  - d. Balance the system.
3. Finally set the controls to the User's requirements.

## 53 HANDING OVER

### ROUTINE OPERATION

Describe the function of the boiler and system controls and show how they are adjusted and used.

Hand these Installation and Servicing Instructions, User's Instructions and Log book to the customer and request him to keep them in a safe place for ready reference.

**IMPORTANT.** Point out the owner that the boiler must have regular maintenance and cleaning, at least annually, in order to ensure reliable and efficient operation. Regular attention will also prolong the life of the boiler and should preferably be performed at the end of the heating season.

Recommend that a contract for this work should be made with the regional gas authority or a Gas Safe Registered Engineer for gas fired boilers.

## 54 MAINTENANCE

### WARNING

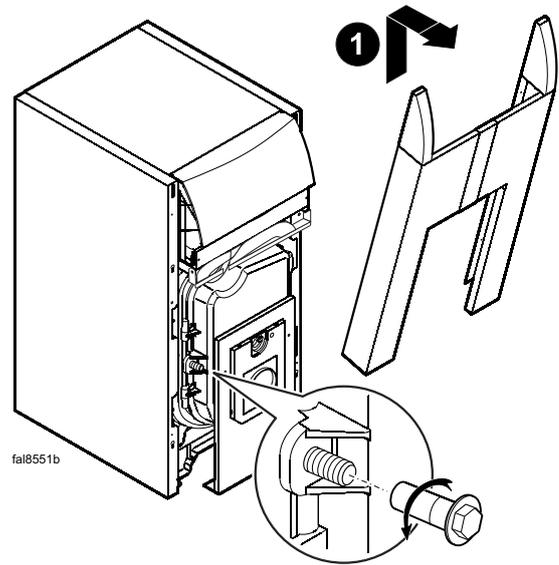
The operations described below shall always be performed with the boiler and the power supply switched off.

The boiler front panel has to be removed to access the various devices to be maintained and checked.

1. Push up and pull the front panel forward.

### Cleaning the Casing Material

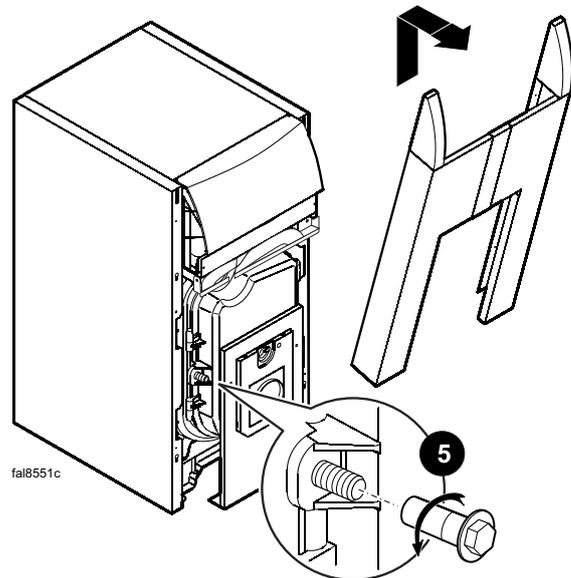
Use a soapy solution and sponge only. Rinse with clean water and dry with chamois leather or soft cloth.



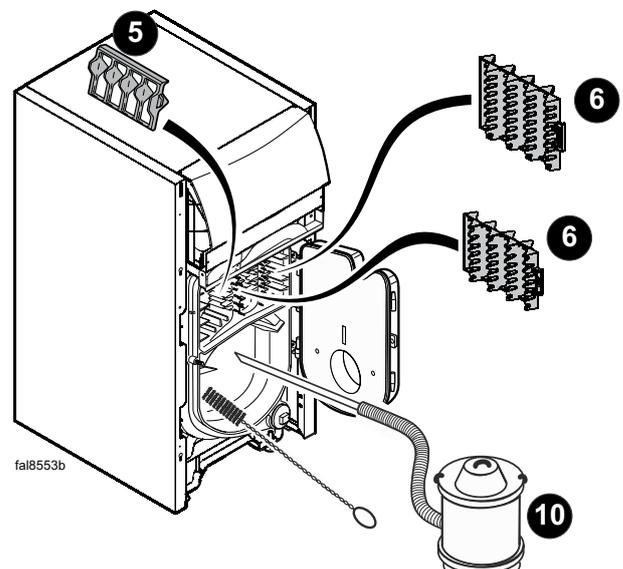
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## 55 CLEANING THE FLUEWAY

1. Close off the fuel supply to the burner.
2. Ensure that the boiler has been cooled to ambient temperature.
3. Isolate the mains supply to the boiler and burner.
4. Disconnect the cable and supply pipe to the burner.
5. Open the combustion chamber door by removing the 2 special bolts.
6. Remove the flue way baffles. (Number variable depending on the model - refer to Frame 22).
7. Thoroughly clean the flue ways and baffles.
8. Remove the rear cleanout covers and dispose of the debris/soot that may have accumulated. (Refer to Frame 29).
9. Replace the rear cleanout covers after first inspecting and if necessary replacing the seal. (Refer to Frame 29).
10. Brush out the combustion chamber and vacuum the soot from beneath the flue ways.
11. Replace the flue baffles into the flue ways. (Refer to Frame 22 for correct location).
12. Check the condition of the combustion chamber door insulation.
13. Check the condition of the combustion chamber door seal.
14. Close the combustion chamber door and replace the front panel.
15. Re-assemble the burner connections.



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## 56 SYSTEM MAINTENANCE

### Water Level

Check the water level in the installation regularly, and if necessary top it up without allowing a sudden inlet of cold water into the hot boiler.

The operation should only be necessary a few times per season; if it has to be done more frequently, there is probably a leak which should be found and corrected without delay.

### Safety Devices

Check that safety devices, and particularly the heating circuit safety valve, are working correctly at regular intervals, and at least when the boiler is cleaned.

### Draining

It is recommended that an installation should not be emptied unless absolutely necessary.

For example: when leaving for several months and/or there is a risk of frost in the building.

## 57 SAFETY

For boilers with gas burners

It is the law that any service work must be carried out by a Gas Safe Registered Engineer.

**WARNING.** Always turn off the gas supply at the gas service cock, and switch off and disconnect the electricity supply to the appliance and any external controls before servicing.

**IMPORTANT.** After completing the servicing or replacement of components always:

- Test for gas soundness

- Check the water system is correctly filled and free of air. Air in the boiler could cause damage to the heat exchanger.
- With the system hot examine all water connections for soundness.
- Check the gas rate and measure the combustion CO/CO<sub>2</sub> content.
- Complete the boiler log book.
- Carry out functional checks as appropriate.

## 58 SERVICING SCHEDULE

To ensure the continued safe and efficient operation of the appliance it is recommended that it is checked at regular intervals and serviced as necessary. The frequency of servicing will depend upon the installation condition and usage but should be carried out at least annually.

**Ideal Boilers** does not accept any liability resulting from the use of unauthorised parts or the repair and servicing of appliances not carried out in accordance with the Company's recommendations and specifications.

1. Light the boiler and carry out function checks, noting any operational faults.
2. Run the boiler for 10 minutes and then check the burner rate.

3. Optional test for gas fired boilers - Connect a suitable gas analyser to the sampling point fitted in the flue adapter. For correct boiler operation the CO/CO<sub>2</sub> ratio of the flue gas should not be greater than 0.004 ratio. If this is the case and the gas input is at least 90% of the nominal, no further action need be taken. If not proceed to 4.
4. Remove and clean the burner.
5. Inspect the heat exchanger through the burner opening. Clean the flueways.
6. Check that the flue terminal is unobstructed and that the flue system is sealed correctly.
7. After completion of servicing refer to previous frame for reference to final safety checks.

## NOTES

## NOTES

## Technical Training

The Ideal Boilers Technical Training Centre offers a series of first class training courses for domestic, commercial and industrial heating installers, engineers and system specifiers. For details of courses please ring: ..... 01482 498 432

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